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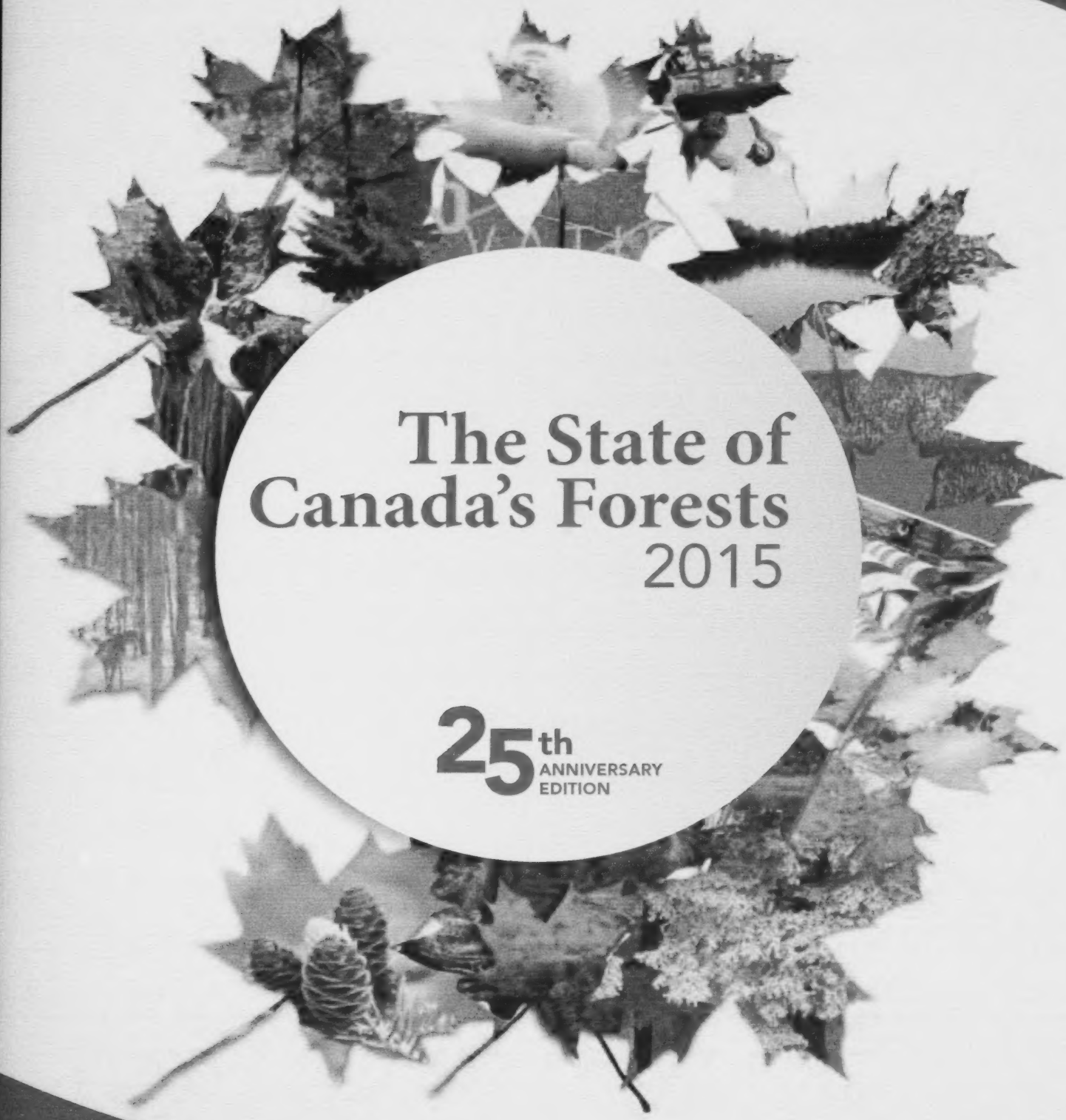

The State of Canada's Forests 2015

25th ANNIVERSARY EDITION

Canada

Natural Resources Canada | Ressources naturelles Canada

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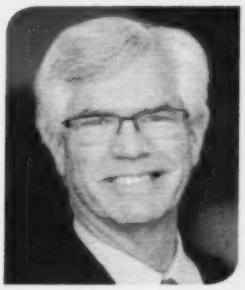
Message from the Minister of Natural Resources



I am delighted to present the 25th annual *State of Canada's Forests* report, which provides a snapshot of an environmentally important resource and economic driver for Canada. It also highlights Canada's forest sector as an innovator and global leader in sustainable forest management.

Managing this resource in an environmentally responsible manner is crucial. Today, Canada is an internationally recognized leader in forest management. In fact, Canada has more forests independently certified as sustainably managed than any other country in the world.

Ensuring our forests are healthy and strong is a strategic advantage for Canada in today's global market place, benefiting our future generations. In 2014, Canada exported $31 billion in forest products to nearly every nation on the planet. Importers value our reputation as a reliable, responsible supplier of high-quality and sustainable forest products.

Canada's forest sector continues to evolve to meet the changes and opportunities of the 21st century. Achieving this requires a strong commitment to forest science. Public and private investments in research allow us to better understand forest ecosystems as well as combat fires, pests and diseases and adapt to the impacts of climate change.

Canada's investment in environmental and clean technology today will ensure that we can create tomorrow's jobs. In fact, today's forest industry jobs are high-tech, green and specialized. The forest sector is already a major employer in Canada, with almost 290,000 Canadians working directly and indirectly in the forest sector, including 9,000 Indigenous people. Indeed, Indigenous communities across Canada have an important relationship with the forest and the forest sector. Their voices and contributions are essential to this sector's development.

Industry leaders also deserve recognition for their role in ensuring that Canada continues to supply the world with high-quality and sustainably sourced forest products. The Forest Products Association of Canada – whose members manage the vast majority of our country's commercial forests – is the only national forest trade association in the world to require members to certify their operations with one or more of the three internationally recognized sustainable forest management standards.

I look forward to working with my provincial and territorial counterparts as well as Indigenous communities, industry and other key stakeholders to ensure the sustainability of Canada's forests and to support the many forest-dependent communities across our country.

Together, we can ensure that Canada's forest sector, and the communities that depend on it, will prosper for decades to come.

The Honourable Jim Carr,
P.C., M.P., Minister of Natural Resources

Celebrating 25 years of reporting on Canada's forests

For a quarter-century, the Government of Canada has been using *The State of Canada's Forests* report to chronicle Canada's progress toward sustainable forest management.

25 YEARS
The State of Canada's Forests report

As a legislated publication, this report is special among forest-related reports. It is the only national snapshot of the social, economic and environmental status of forests and forestry in Canada. And it's supported by detailed analysis, statistics and the best forest science.

The State of Canada's Forests report shows the importance of forests and forestry in Canada, too.

For 25 years, the report has demonstrated that the Government of Canada knows how valuable forests are to Canadians. From recreational opportunities and social and cultural values, to economic opportunities and ecosystem services that improve the lives of Canadians, our forests are as important today as they were 25 years ago.

Here's to the next 25 years.

1990 — First *State of Canada's Forests* report released

1992 — Earth Summit takes place in Rio de Janeiro, Brazil

2002 — Forest Products Association of Canada announces members to certify their operations as sustainable

2006 — Canada and U.S. reach a truce in softwood lumber dispute

2007 — U.S. housing market collapses

2009 — British Columbia becomes first province to allow wood-frame buildings up to six storeys tall

2014 — Tsilhqot'in decision on Aboriginal title from Supreme Court of Canada

A picture is worth 1,000 words

To celebrate 25 years of sharing the story of Canada's forests, Natural Resources Canada–Canadian Forest Service is proud to present a picture of our forests through the graphics on the next pages.

Do you know a lumberjack?
Where do forest fires and insect outbreaks affect Canada's forests?
Forest products trading partners
Estimated value of Toronto's urban forest: $7 billion
Do jobs grow on trees?
When will Canada harvest its last tree?
Can you spot the forest products?
Will my flying car be made of wood?
Five things you need to know about deforestation in Canada.

Share your love for Canada's forests

Share, tweet and post your favourite forest photos or share these graphics with the hashtag #CanadaForests.

You'll find all the graphics at
cfs.nrcan.gc.ca/stateoftheforests

When will Canada harvest its last tree?

Never.

Canada's forests are renewable resources that are carefully managed to ensure that their social, economic and environmental benefits are available for generations to come.

In fact, studies have confirmed that Canada has some of the most rigorous forest management policies in the world.

Canada has:

348 million hectares of forest

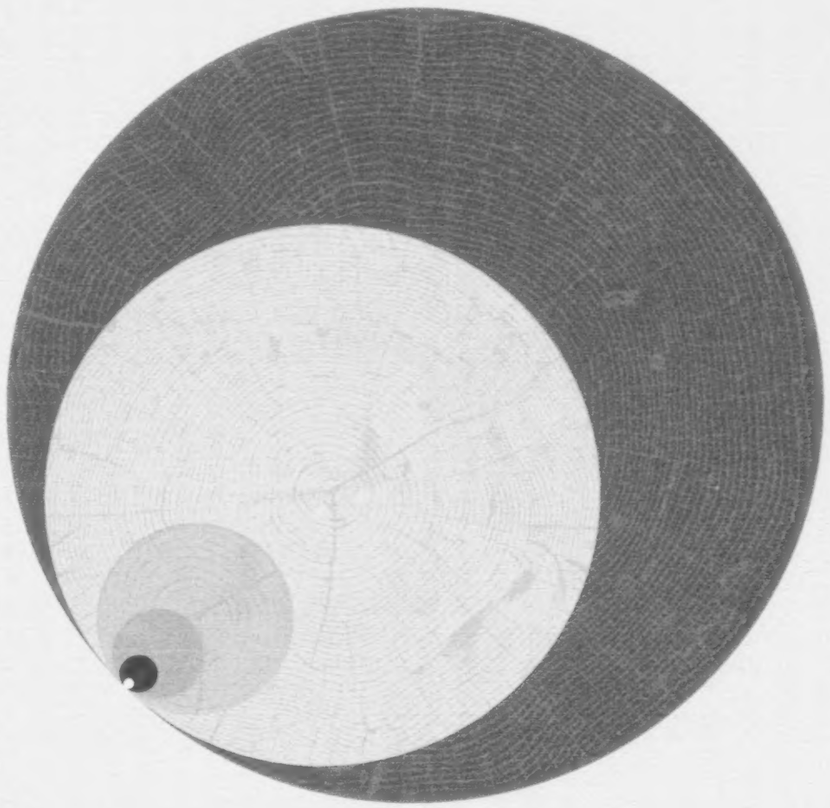
161 million hectares of forest **independently certified as sustainably managed** (2014)

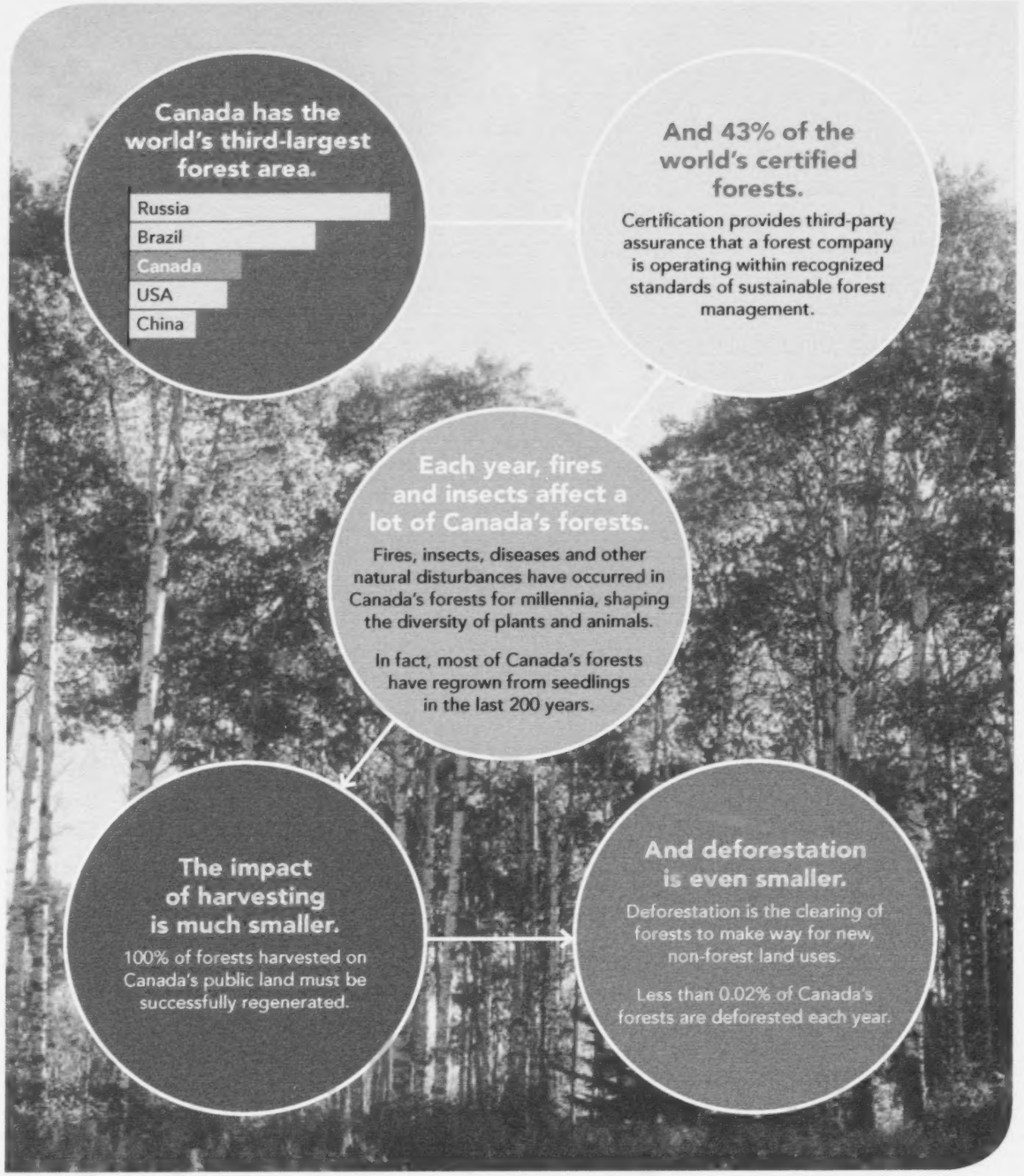
20.1 million hectares of forest **damaged by insects** (2013)

4.6 million hectares of forest **burned in forest fires** (2014)

0.74 million hectares of forest **harvested** (2013)

0.05 million hectares of forest **deforested** (2013)




Canada has the world's third-largest forest area.
Russia
Brazil
Canada
USA
China
And 43% of the world's certified forests.
Certification provides third-party assurance that a forest company is operating within recognized standards of sustainable forest management.
Each year, fires and insects affect a lot of Canada's forests.
Fires, insects, diseases and other natural disturbances have occurred in Canada's forests for millennia, shaping the diversity of plants and animals.
In fact, most of Canada's forests have regrown from seedlings in the last 200 years.
The impact of harvesting is much smaller.
100% of forests harvested on Canada's public land must be successfully regenerated.
And deforestation is even smaller.
Deforestation is the clearing of forests to make way for new, non-forest land uses.
Less than 0.02% of Canada's forests are deforested each year.

Five things you need to know about deforestation in Canada.

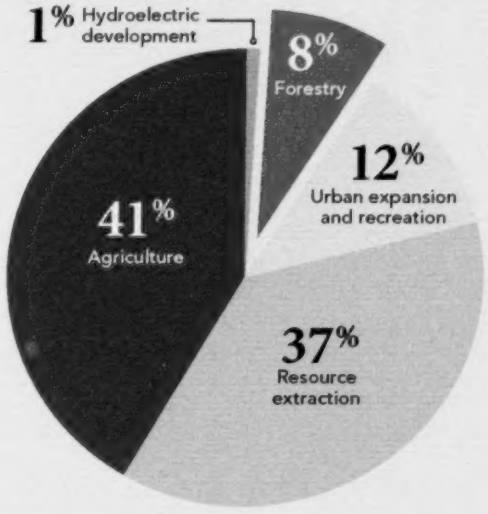
1.
Deforestation is permanent forest loss.

Deforestation is the clearing of forests to make way for non-forest land uses, such as urban development or agriculture. It is different from temporary forest cover loss from things like harvesting, insect outbreaks or forest fires, where the forest will grow back. Deforestation is serious because it reduces biodiversity and wildlife habitat, affects water and soil quality, and has an influence on climate change.

2.
Deforestation in Canada is tiny.

Canada's 348 million hectares of forest lands represent about 9% of the world's forests, but contribute just 0.3% to deforestation globally. In 2010, about 46,000 hectares of Canadian forest were converted to another land use. **Annually, this represents less than 0.02% of Canada's forest land.**

Of the less than 0.02% of Canada's forests lost to deforestation each year, these are the causes:



5.
Forestry isn't a top cause.

In 2010, forestry was responsible for about 8% of Canada's deforested area, primarily through the creation of forestry roads. Harvesting does not cause deforestation, as trees are required to be regenerated after harvest. Clearing forests for agricultural use accounted for 41% of deforestation in Canada in 2010. The remaining causes of deforestation in Canada are resource extraction (37%), urban expansion and recreation (12%), and hydroelectric development (1%).

3.
Canada monitors deforestation closely.

Natural Resources Canada–Canadian Forest Service (NRCan–CFS) tracks what is happening to Canada's forests, using a combination of satellite data, aerial photos and other information. NRCan–CFS tracks where and when deforestation has occurred and the causes of land-use change, such as urban development, agriculture or resource extraction.

4.
Deforestation rates in Canada are declining.

Over the past 20 years, annual deforestation rates in Canada have declined, dropping from 64,000 hectares in 1990 to about 46,000 hectares in 2010. Since 1990, about 0.33% of Canada's total forest area has been converted to other land uses. Governments and industry are trying to better understand and reduce deforestation in Canada by planning land uses over an entire landscape and encouraging different land users to work together.

Can you spot the forest products?

Even when you are far from the woods, you are surrounded by the forest.

Today's Canadian forest sector is extremely advanced, producing a wide range of products that improve our quality of life. Many of the items that you use every day are made with forest-based materials, even some you would never expect. Try to spot the forest products in the image below...

This image contains 16 forest products.

Answers on page 75

Who is buying Canada's forest products?

Over 180 different countries all over the world.

In 2014, Canada exported $31 billion in forest products to nearly every nation on the planet. Importers value our reputation as a reliable, responsible supplier of high-quality and sustainable forest products.

United States
$20.3 billion

Canada's main forest product export to the United States is softwood lumber, which is used to build and repair homes and other buildings.

China
$4.8 billion

China is Canada's second-largest forest product export market. Wood product exports to China have increased 10-fold since 2007. And, in 2012, China became the number one destination for Canadian pulp products.

Japan
$1.5 billion

Canada is the world's leading exporter of softwood lumber to Japan, which is used to build earthquake-resistant buildings.

South Korea
$498 million

Chemical and semi-chemical pulps represent half of Canada's exports to South Korea. The pulps are used to make paper and packaging material.

India
$455 million

India is one of the fastest-growing markets in the world. Newsprint accounted for just over half of Canada's forest product exports to India with the remainder consisting mainly of pulp.

Indonesia
$452 million

Forest product exports to Indonesia have grown significantly in recent years, thanks to increasing demand for chemical wood pulp, which is used to make make paper and sanitary paper products.

United Kingdom
$366 million

Wood pellets are a key export to the UK. They are used as an environmentally friendly heating fuel and for electricity production.

Taiwan
$268 million

Forest product exports to Taiwan are very diverse; Canada exports almost the same value of wood products and wood pulp, with paper products making up about 20% of forest product exports.

Brazil
$197 million

Paper products account for 98% of Canadian forest product exports to Brazil, most of which is newsprint.

Mexico
$169 million

Canada exports important quantities of kraft paper, paperboard and chemical wood pulp to Mexico for use in its packaging industry.

All others
$1.9 billion

Canadian exports go to nearly every country in the world. In fact, only about 20 nations don't buy Canadian forest products.

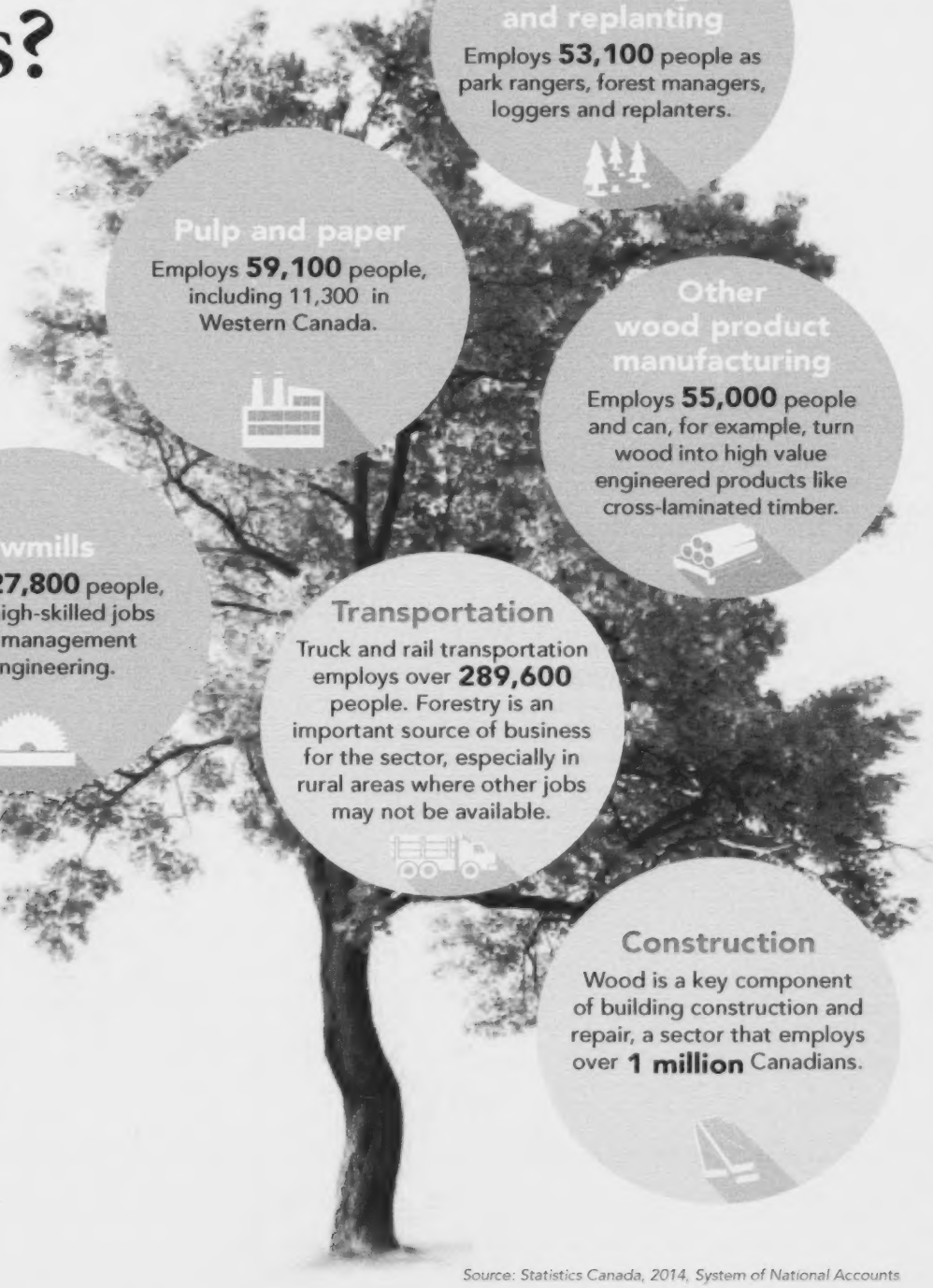
Canada's top forest product trading partners:

1. United States
2. China
3. Japan
4. South Korea
5. India
6. Indonesia
7. United Kingdom
8. Taiwan
9. Brazil
10. Mexico

Do jobs grow on trees?

Yes, they do!

Over 195,000 Canadians are employed in the forest sector – plus spin-off jobs in sectors such as construction, transportation, food and retail.



Forest management, harvesting and replanting

Employs **53,100** people as park rangers, forest managers, loggers and replanters.

Pulp and paper

Employs **59,100** people, including 11,300 in Western Canada.

Other wood product manufacturing

Employs **55,000** people and can, for example, turn wood into high value engineered products like cross-laminated timber.

Sawmills

Employs **27,800** people, many in high-skilled jobs such as management and engineering.

Transportation

Truck and rail transportation employs over **289,600** people. Forestry is an important source of business for the sector, especially in rural areas where other jobs may not be available.

Construction

Wood is a key component of building construction and repair, a sector that employs over **1 million** Canadians.

Making the most of each tree

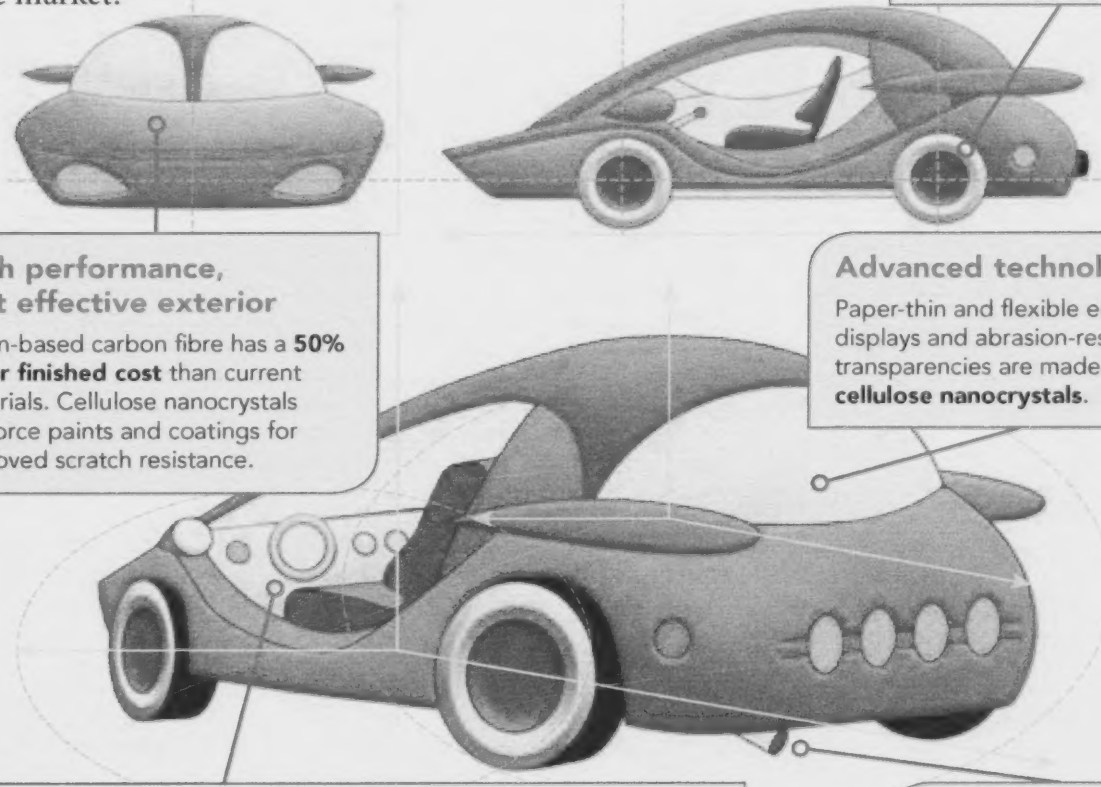
Different sections of a tree have different strength, appearance, and other characteristics. This means many products can come from a single tree, such as lumber, paper, pellets for energy generation, and even sweeteners.

Source: Statistics Canada, 2014, System of National Accounts

Will my flying car be made of wood?

Most certainly!

Canada is a global leader in innovative forest product research and development. With cutting-edge forest-derived compounds emerging all the time, there is little doubt that wood products will be the material of choice when flying cars hit the market!



Greener tires

Lignin replaces petroleum-derived carbon black for lighter tires, improving fuel efficiency.

High performance, cost effective exterior

Lignin-based carbon fibre has a **50% lower finished cost** than current materials. Cellulose nanocrystals reinforce paints and coatings for improved scratch resistance.

Advanced technology

Paper-thin and flexible electronic displays and abrasion-resistant transparencies are made from **cellulose nanocrystals**.

Lightweight and durable interior

Wood fibre mats mould into products like dashboards and door panels that are **40% lighter** than current materials. Cellulose nanocrystals or lignin-based **bioplastics** produce strong yet lightweight interior components like door handles and instrument panels.

Fueled by trees

Sustainable biomethanol made from wood fibres powers your car.

Where do forest fires and insect outbreaks affect Canada's forests?

Just about everywhere.

Forest fires and insect outbreaks are called "natural disturbances" by foresters. Disturbances have been shaping and changing Canada's forests for millennia. Some disturbances are public safety or forest management concerns, but many are not. Disturbances are an important force of renewal in Canada's forests.

Areas burned since 1990

Areas affected by major insect outbreaks:

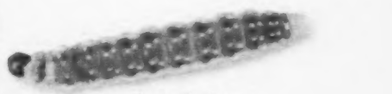
- Mountain pine beetle
- Forest tent caterpillar
- Spruce budworm
- Mountain pine beetle and forest tent caterpillar
- Forest tent caterpillar and spruce budworm

Wild fires

Boreal forests literally rise from their own ashes after a fire. Black spruce, aspen, birch and jack pine dominate huge areas in Canada because they can quickly recolonize an area after it has been burned. In fact, jack pine cones only release their seeds when they are exposed to a very hot fire. In this way, fires are a source of renewal.

Defoliators

The spruce budworm and forest tent caterpillar are examples of defoliators – insects that eat leaves or needles. Outbreaks of defoliators have occurred periodically in Canada's forests for centuries. Spruce budworm and forest tent caterpillar outbreaks are typically very large. Millions of trees can be damaged during an outbreak, but most recover or regenerate. Evidence of past outbreaks can be found in the growth rings of old trees.



Spruce budworm

Forest tent caterpillar

Bark beetles

Bark beetles usually kill only the oldest and weakest trees, which creates space for young trees to grow while building a more diverse forest. But some, like the mountain pine beetle, occasionally become so numerous that they kill even the healthiest trees. When this happens, the people and communities who rely on the forest can be negatively affected. The mountain pine beetle is native to western North America, but now it is spreading north and east into the boreal forest.

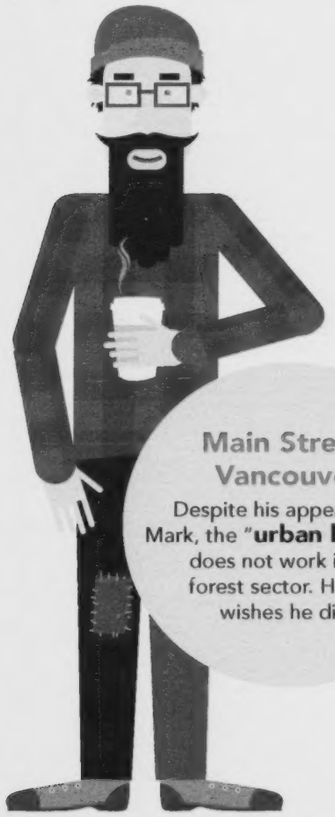
Mountain pine beetle

Insect information from the Pest Strategy Information System can be found online at https://afc-fr.cfsnet.nfis.org/NFPS-SNLRF/. Fire information is available from the Canadian Wildland Fire Information System at http://cwfis.cfs.nrcan.gc.ca/home.

Do you know a lumberjack?

You do. You just don't recognize them.

With over 195,000 jobs in Canada's forest sector, odds are you know someone working in forestry – even if you don't recognize them. Today's jobs are high-tech, green and specialized. The plaid shirts and suspenders of lumberjacks have been joined by lab coats and ties.



Main Street, Vancouver

Despite his appearance, Mark, the "**urban hipster**," does not work in the forest sector. He just wishes he did.

Prince George, BC

Krista is a **biologist** who helps companies plan their harvesting operations to ensure that forests are sustainably managed.

Meadow Lake, SK

Robert is an **inspection technician**. He checks and maintains forest equipment for safety.

Québec City, QC

Martine works as a **genomics researcher**, improving disease resistance in trees.

Corner Brook, NL

Jim isn't exactly a lumberjack. He's a **forest technician,** gathering information such as the size of trees and biomass level.

High Level, AB

James is a **chemical engineer** developing new consumer products using cellulose nanocrystals.

Toronto, ON

Zhichao is an **economist** in a forest company head office. He works to optimize the forest sector supply chain in an environmentally sustainable way.

Map showing where sawmills and mills are located in Canada.

Pulp and paper mills produce everyday items, such as office paper and newspapers, as well as specialty paper and pulp. Pulp can also be used to create fabrics like rayon.

Sawmills and solid wood product manufacturers mainly create lumber and panels, like plywood and particleboard. Sawmills also produce cutting residues that are used to create particleboard, wood pellets and wooden I-beams.

What have the forests done for you lately?

From the air you breathe to the ground you walk on, biodiversity improves your quality of life.

Ecosystems, including forests, are made up of living things, their non-living environment, and the interactions among them. These interactions create valuable benefits that are collectively called "ecosystem services."

One of the goals of sustainable forest management is to protect biodiversity so Canadians can continue to benefit from ecosystem services long into the future.

Ecosystem services:

Providing habitat
> Because species depend on each other, forests create suitable spaces in which various creatures can live.

Cycling nutrients
> Biodiversity helps the efficiency of processes like decomposition and carbon absorption.

Improving resilience
> Forests with high biodiversity are better able to adapt to changing conditions.

Controlling pests
> Having lots of biodiversity means some wasps and beetles prey on pest species that harm trees, keeping natural processes in balance.

Providing recreational opportunities
> Activities like camping, hiking and birdwatching benefit from biodiversity.

Average value of an urban tree in Toronto: **$700**
Estimated value of Toronto's urban forest: **$7 billion**
Estimated value of ecosystem services provided annually in Montreal: **$4.29 billion**
Estimated weight of carbon absorbed by Canada's managed forests annually: **424 CN Towers**

Sustainability indicators

Canada's forests are a renewable resource with rich, resilient ecosystems. They offer significant environmental benefits, many opportunities for responsible economic development, and innumerable services that contribute to the quality of life of all Canadians.

Canada recognizes the need to balance the many demands placed on its forests in a holistic way so that current and future generations of Canadians can benefit from the many ecological, economic and social values of forests.

Canada: A leader in reporting on sustainable forest management

The first *State of Canada's Forests* report, in 1990, recognized these values and described the need for new mechanisms by which to incorporate them into forest management. Since then, Canada has been a world leader in developing quantifiable measures, called indicators, to carefully monitor forests so as to ensure that any challenges to their health are addressed.

In 1991, after extensive consultation with stakeholders, Canada published its first set of environmental, economic and social indicators, organized to address 12 key questions about forests and forestry in Canada. In 1994, with Canada's leadership, Canada and 11 other countries formed the Montreal Process and in 1995 agreed to use a common set of science-based indicators that would give government, industry, researchers and the public a way to consistently define, assess, monitor and report progress on the sustainable management of 90% of the world's boreal and temperate forests. By 2000, indicator processes had emerged for most of the world's forest ecosystems, and in 2013, again with Canada's leadership, the Montreal Process and other international forest indicator processes agreed to better align their indicator reporting requirements and improve the quality of data available for global forest reporting.

25 years of demonstrating progress

Over the years, the format of reporting on the status and trends in Canada's forests has changed. In 2014, Canada returned to organizing its indicators in a way that will address readers' most pressing questions about forests and forestry in Canada. The indicators presented in this section are comparable to indicators published by other countries and use data that were published in the United Nation's 2015 *Global Forest Resource Assessment*. This will give readers the opportunity to see improvements in Canada's forests and forest practices and to compare Canada's practices with those of others.

Sustainability indicators are beneficial in several ways. They:

- provide essential information for use in discussions about the state of Canada's forests
- help identify where forest management practices and policies can be improved
- clearly demonstrate Canada's environmental credentials

These indicators provide a clear picture of the interactions between forests and society over time. They also show the successful results of 25 years of commitment to sustainably managing the country's forests. Canadians can feel confident that even as economic, environmental and social circumstances continue to change, their forests will continue to provide a broad range of benefits. Similarly, Canada's trading partners can feel confident that the Canadian forest products delivered to them come with strong environmental credentials from sustainably managed sources.

Sources and additional information for the sustainability indicators are provided starting on page 58.

How much forest does Canada have?

Canada has 348 million hectares (ha) of forest land. This represents 9% of the world's forests and 24% of the world's boreal forests. Forests dominate the Canadian landscape almost everywhere except the Arctic and the Prairies.

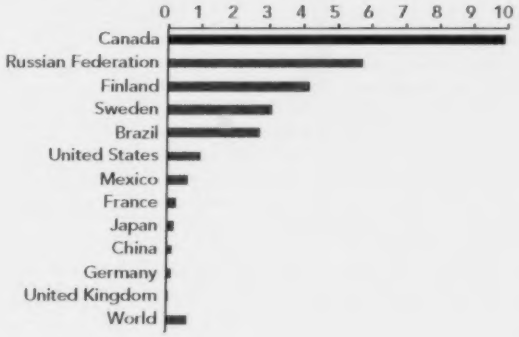
In many countries, forests are under enormous development pressure. In Canada, however, forests grow in many areas that are remote, sparsely populated and not well suited to other land uses. With nearly 10 ha of forest per person, Canadians have more forest area per capita than do residents in most other countries.

Not all of Canada's forests are highly productive. In many regions, particularly in the boreal zone, trees grow very slowly. But Canada's forests still provide important ecosystem services, such as water and air purification, carbon cycling, and habitat for native plant and animal biodiversity. Some of the world's largest forest areas are in Canada.

Commercial forests also provide ecosystem services in addition to sustainably harvested wood fibre to meet society's demands. Most of Canada's commercial forests are on publicly owned lands that have been designated for multiple-use sustainable forest management.

The provinces and territories monitor regeneration and wood volume growth in the commercial forest areas they manage, collaborating with the federal government in this and many other aspects of sustainable forest management.

Per-capita forest area (hectares per person)



What is a forest?

The Food and Agriculture Organization of the United Nations (FAO) defines **forest land** as an area where the tree canopy covers more than 10% of the total area and the trees, when mature, can grow to a height of more than 5 metres. It does not include land that is predominantly urban or used for agricultural purposes.

Land that temporarily has no trees is still considered to be a forest when the disturbance is known to be temporary and trees are expected to grow back soon (e.g., after harvesting). This is in contrast to:

- **deforestation** – the permanent clearing of forests to make way for new, non-forest land uses
- **afforestation** – the establishment of forests on lands that were previously non-forested

Naturally caused additions and removals of tree cover (e.g., from fire or pests) are considered neither deforestation nor afforestation.

Source: See *Sources and information* for more detail.

Indicator: Forest area

Why is this indicator important?

Knowing how and why the area of permanent forest cover changes over time is important for managing forests sustainably because permanent losses and gains in forest area affect the long-term availability of resources and the provision of ecosystem services like water and air purification.

What has changed and why?

Canada's 348 million ha of forest land is relatively stable, but the forest cover within this area is continuously changing. Every year, changes in forest cover areas can be attributed to insects, wild fire, timber harvesting and other natural and anthropogenic disturbances, but these changes do not result in a permanent loss of forest area unless the forest fails to recover. Most of Canada's forests are on public lands, where forest cover must be restored after harvesting.

In the past, many of Canada's agricultural and settlement lands were covered by forest, but the current rate of land-use change is very low. Only about 0.02% of Canada's forest area is lost each year through deforestation (permanent change to non-forest land use, such as agriculture or settlement). Even so, deforestation is closely monitored to ensure that causes and impacts are well understood.

What is the outlook?

The overall forest area in Canada is expected to remain generally stable. Conversion of forest lands to non-forest land uses continues in some areas, but the changes of greatest concern are those that could occur as a result of changing climate, because very large areas could be affected.

How big are Canada's forests?

Canada's forests could fill all of Japan, Italy, Cambodia, Nicaragua, France, Germany, Ghana, Cameroon, Sweden, South Korea and Uruguay, and we'd still have enough trees left over to fill the United Kingdom.

Source: National Forest Inventory. See *Sources and information* for more detail.

Indicator: Wood volume

Why is this indicator important?

Wood volume is an indicator of sustainable forest management. Professional foresters monitor tree growth to determine sustainable harvest levels and make management plans. The overall sustainable wood supply level currently estimated for Canada is 224 million cubic metres (m^3) per year.

What has changed and why?

The total wood volume in Canada's forests is about 47 billion m^3.

Most of Canada's forests are relatively slow-growing, but some are highly productive. Tree growth rates are determined by climate, local site conditions, tree health, tree age, genetics and competition among trees for light, space and nutrients. These tree growth variations lead to big differences in standing volumes at sites across Canada:

- Canada's fastest-growing and oldest trees are found in the Pacific Maritime ecozone. There, the average wood volume is 432 m^3 per hectare (ha), more than triple the national average of 136 m^3/ha.
- Canada's slowest-growing forests are found in the Taiga Shield ecozone (with an average wood volume of 61 m^3/ha) and the Hudson Plains ecozone (36 m^3/ha).

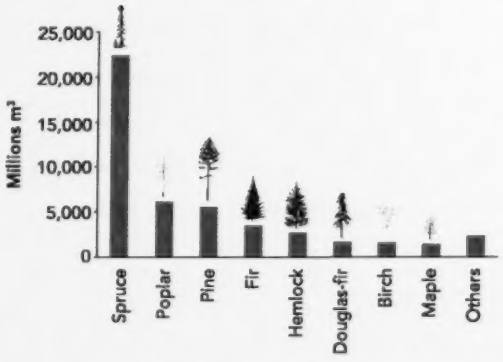
What is the outlook?

Wood volume is expected to stay relatively unchanged as both harvesting and natural disturbances (such as fire and insect infestations) continue to be offset by forest regeneration and growth.

Timber supply analysis

Most of Canada's forests are on publicly owned (Crown) lands. Many of these forests are managed for multiple uses, including timber supply. Sustainable wood supply levels are determined for these forests by provincial and territorial governments using sophisticated computer software to estimate future wood volume growth based on the best available data. These timber supply analyses are updated regularly to take into account wood volume losses caused by natural disturbances and to incorporate new advances in forest science that make better timber forecasting possible.

Total wood volume in Canada by species group



Source: National Forest Inventory. See *Sources and information* for more detail.

Indicator: Deforestation and afforestation

Why is this indicator important?

Knowing how and why areas change over time is important for managing forests sustainably because such changes may result in deforestation or afforestation of Canada's landbase. Deforestation is a concern because forests provide a number of ecosystem services, such as water purification, erosion control and provision of wildlife habitat. Forests also affect global climate.

What has changed and why?

Over the last two decades in Canada, the annual rate of deforestation has declined, dropping from 64,000 hectares (ha) deforested in 1990 to about 46,000 ha deforested in 2010. Two spikes in this trend occurred when hydroelectric reservoir development in Quebec resulted in forest areas being submerged: 35,000 ha in the mid-1990s and another 28,000 ha in the mid-2000s.

Since 1990, about 0.33% of Canada's total forest area has been converted to other land uses (including agriculture and urban development).

Deforestation is the clearing of forests to make way for new, non-forest land uses.

Afforestation is the planting of forests on lands that were previously non-forest lands.

Urban and rural afforestation planting initiatives are underway in many regions of Canada, but the land areas involved in recent years have been very small relative to the total forest area in the country.

What is the outlook?

Deforestation and afforestation will be affected by local and global socio-economic factors. However, the overall rate of deforestation in Canada is expected to decline further over time. Conversion of forest to agricultural land uses will likely remain the largest cause of deforestation in Canada, although deforestation from activity in Western Canada's oil and gas sector is increasing.

Estimated area (hectares) of deforestation in Canada, by industrial sector, 1990–2010

SECTOR	YEAR				
	1990	1995	2000	2005	2010
Agriculture	42,100	22,200	20,500	19,100	18,900
Forestry*	3,700	3,300	3,600	3,800	3,800
Hydroelectric	2,700	1,500	900	1,100	600
Industry and transportation					
Industry	900	900	900	900	900
Mining	2,800	2,700	2,900	2,700	2,500
Oil and gas	4,400	5,400	7,900	11,300	11,100
Transportation	2,000	1,700	3,000	2,800	2,700
Municipal	3,900	3,700	4,300	4,700	4,700
Peat mining	900	700	500	100	100
Recreation	600	700	700	600	600
TOTAL	**64,000**	**42,600**	**45,000**	**47,200**	**45,900**

Rounding of numbers may affect column totals.
*Forestry numbers result from the creation of permanent forestry access roads.

Source: National Forest Inventory. See *Sources and information* for more detail.

Spotlight: Canada's forests in a global context

Global Forest Resources Assessment

The Food and Agriculture Organization of the United Nations (FAO) prepares a *Global Forest Resources Assessment* (FRA) every five years, using official statistics provided by countries from around the world. Natural Resources Canada generates statistics about Canada's forests and works with the FAO and other major forest nations to help improve FRA data collection, analysis and reporting.

The 2015 FRA was released in September at the World Forestry Congress in Durban, South Africa. These five-year FAO reports provide an excellent global context for understanding the state of Canada's forests.

Assessing the state of the world's forests is important and challenging. Countries around the world measure and report on their forests differently, and some forest attributes remain difficult to measure. For example, many countries have difficulty measuring and reporting on **forest naturalness**. It is not easy to measure the degree of human impact on forests because of the great variety of ways in which people live and work in forests, and the different ways that forests respond to these impacts.

Forest naturalness

The FAO recognizes seven degrees of forest naturalness, but asks countries to report on a more simplified continuum of three categories: primary forests, other naturally regenerated forests, and plantations. According to the FAO, primary forest is defined as "naturally regenerated forest of native species, where there are no clearly visible indications of human activities and the ecological processes are not significantly disturbed."

Forest conversion and deforestation

It is important to know how much forest is protected or managed in a natural or semi-natural condition and how much natural forest is converted to industrial plantations or to non-forest uses (deforestation).

In many parts of the world, primary forests are converted to industrial plantations to increase wood production and develop local economies. These forest conversions are associated with loss of biodiversity and other ecological impacts. Primary forests are also lost through deforestation, with associated negative ecological impacts. In contrast with many other countries, forest conversion and deforestation affect a very small proportion of Canada's forests. For example, in 2013 less than 0.02% of Canada's forests were deforested, and most of Canada's forests remain natural in character.

Comparing data from different countries

Some data are difficult to compare because they are collected in very different ways. For example, a particular forest type might be reported as primary forest in one country but not in another, making it difficult to compare national statistics. As a result, caution is needed in assessing global and regional forest conditions and trends, being mindful of reporting differences and peculiarities.

Canada's forests

In the 2015 FRA, Canada reports that 59% of its forests are primary forests. Canada's forest inventory does not directly allow for measuring primary forest areas, so this estimate is based on the assumption that primary forests include protected forests and inaccessible forests (where there are no roads). Having large areas of natural forest provides Canadian foresters with the opportunity to develop an excellent understanding of what natural forests look like and how they work (forest composition and ecological function) when minimally affected by human activities. Managing the forest in a way that closely mimics a historical norm or natural baseline is therefore easier to do in Canada than in many other parts of the world where human activity and extensive development have made it impossible or extremely difficult to define a historical norm.

Most of Canada's forests are on publicly owned lands: only 6% is located on private lands. The vast majority of harvesting occurs in publicly owned forests that are managed for multiple values (including wood supply, recreation, soil and water quality, and biodiversity) and are regenerated by native species. Canadian forests regenerate naturally after harvesting, but some are planted to ensure prompt regeneration. Intensively managed plantations are far less common in Canada than in other major wood and wood-product exporting nations.

Source: See *Sources and information* for more detail.

Natural disturbance in Canada's forests

In Canada, forest cover is lost and gained naturally on an ongoing basis. For example, boreal forests are subject to periodic burning by wildfires and outbreaks of insects that damage trees, both events that stimulate forest renewal. Canadian forest management operations seek to emulate these natural disturbance regimes.

Photo courtesy of Environment and Natural Resources, government of the Northwest Territories

How much timber is harvested, and is harvesting done sustainably?

Harvesting and the regeneration practices that go along with it are at the heart of Canada's sustainable forest management regime. Together, these activities ensure that the forest industry continues to provide a steady stream of benefits to Canadians and that our forests remain healthy and sustainable. While harvest and regeneration activities are the most significant interventions made by humans in terms of area, natural disturbances actually affect a far greater area of Canada's forests each year.

In 2013, 148 million cubic metres (m^3) of industrial roundwood were harvested in Canada, mainly for use in the production of lumber, but also for panel products (such as plywood, veneer and oriented strandboard) and pulp and paper products. This represents approximately 0.3% of Canada's total standing wood volume (47 billion m^3). British Columbia accounts for nearly half (48%) of Canada's industrial roundwood harvest, followed by Alberta and Quebec.

Harvest regulation

Statistics show that over the last decade, more than 85% of the total volume of timber harvested for industrial use in Canada each year originates from provincial Crown lands. Provincial governments regulate these harvest levels by specifying an allowable annual cut (AAC), which is the annual level of harvest allowed on a particular area of Crown land over a specific number of years (5–10 years in most cases) to ensure sustainability over the long term.

Although actual harvest levels can occasionally fall well below or above the AAC level because of market conditions or business decisions, AAC levels cannot be exceeded over a specified planning period. No AAC is determined for Canada as a whole, but it is possible to compare the combined provincial AACs with the combined timber harvest totals from the same Crown landbase.

Regeneration after harvesting

All areas of provincial Crown land that are harvested for timber are required to be regenerated using natural or artificial means (i.e., planting and seeding), or a mix of the two. Successful regeneration of harvested areas ensures that forest lands remain productive for wood fibre and continue to provide key ecosystem services, such as storing carbon, regulating water quality and quantity, and providing wildlife habitat and recreation opportunities. Although standards and regulations for achieving successful regeneration vary by province, they commonly address species composition, density and distribution; age and height of the regenerating trees; and the distribution of various forest types and age classes across the landscape.

Natural versus artificial regeneration

More than half of harvested areas in Canada are regenerated through artificial regeneration. Natural regeneration offers many benefits: it needs little human assistance, it creates a solid foundation for ecosystem-based management, and it generally costs less than artificial regeneration. However, control over species composition is difficult, and thinning or fill planting may be needed to ensure that density and stocking levels meet regeneration standards. As a result, artificial regeneration is often used to increase the likelihood of achieving regeneration to planned future forest species compositions. It also provides more control of density and stocking levels.

Source: See *Sources and information* for more detail.

Indicator: Area harvested

Why is this indicator important?

The annual area harvested is one of several indicators of the level of activity in the forest sector. It also tracks the amount of that particular human disturbance in the forest. In conjunction with monitoring regeneration practices and wood volume inventory, monitoring the area harvested ensures that Canada's forests are managed for long-term sustainability.

What has changed and why?

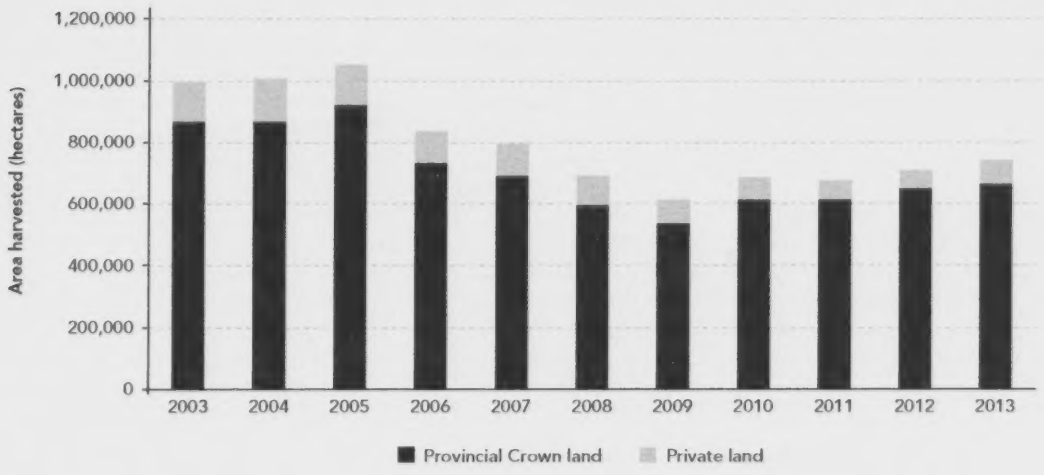
The area of Canada's forest land that was commercially harvested in 2013 increased by 4% over the year before – from 710,000 hectares (ha) in 2012 to nearly 740,000 ha in 2013.

This increase can be attributed largely to an increase in the demand for forest products as the global economy continues to improve from the 2008 recession. Both steady growth in U.S. housing starts and steady demand for wood products in China affected the area of Canada's forests harvested in 2013. Although it has been slowly increasing since 2009, the area harvested remains well below pre-recession levels, and represents less than 0.5% of Canada's 348 million ha of forest land. It is significantly smaller than the area disturbed each year by fire and insects. For example, in 2013, fires and insect outbreaks disturbed about 7% of Canada's 348 million ha of forest land.

What is the outlook?

The area of Canada's forest land that is commercially harvested is positively correlated with the demand for forest products. Thus, as the global economy continues to improve and the demand for forest products rises, the area harvested is expected to expand, though not likely to regain the highs of 2005.

Forest area harvested on private and provincial Crown lands in Canada, 2003–2013



Source: National Forest Database. See *Sources and information* for more detail.

Indicator: Regeneration

Why is this indicator important?

Successful regeneration ensures that harvested areas regrow as forests and continue to both produce wood fibre and provide key ecosystem services, such as storing carbon, regulating water quality, and providing wildlife habitat and recreation opportunities.

What has changed and why?

Natural regeneration is the most efficient approach to regeneration for many forest types and silvicultural systems. However, artificial regeneration, achieved through planting and seeding, remains an important part of forest management and typically accounts for just over half of the area regenerated annually. Artificial regeneration is often prescribed to ensure that specific targets for species composition and growth are met and are achieved in a timely manner.

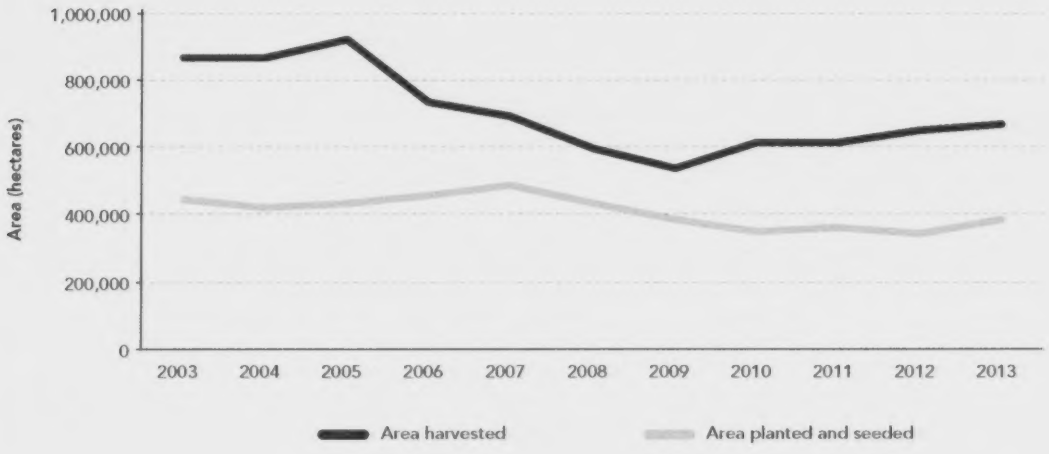
Rates for artificial regeneration are closely tied to harvest rates on provincial Crown lands, which is where most harvesting occurs and where successful regeneration is a provincially regulated requirement. However, changes in the regeneration trend tend to lag behind changes in the harvest trend because of the time required for planning, site preparation and the acquisition of nursery stock.

As harvest levels declined from a peak in 2005, so too did the area regenerated artificially, starting in 2007. However, with the gradual recovery in harvesting, by 2013 the area regenerated by planting and seeding had rebounded to levels not seen since 2009 and was only 7% below the 10-year average. For 2013, this national recovery was largely the result of increases in Quebec and Alberta. The area artificially regenerated stayed relatively stable in all of the other provinces.

What is the outlook?

Many export markets for Canadian wood products have improved in recent years, so harvest levels should stay stable or increase. By extension, the area regenerated through planting and seeding should correspondingly stay level or increase.

Area harvested and area planted and seeded on provincial Crown lands in Canada, 2003–2013



Source: National Forest Database. See *Sources and information* for more detail.

Indicator: Volume harvested relative to the sustainable wood supply

Why is this indicator important?

"Sustainable wood supply" is the term used to describe the estimated volume of timber that can be harvested from an area while meeting environmental, economic and social objectives. Tracking harvest volumes allows forest managers to determine whether they fall within sustainable levels.

What has changed and why?

Between 2012 and 2013, Canada's estimated sustainable wood supply declined by approximately 1%, from an estimated 226 million to 224 million cubic metres (m^3).

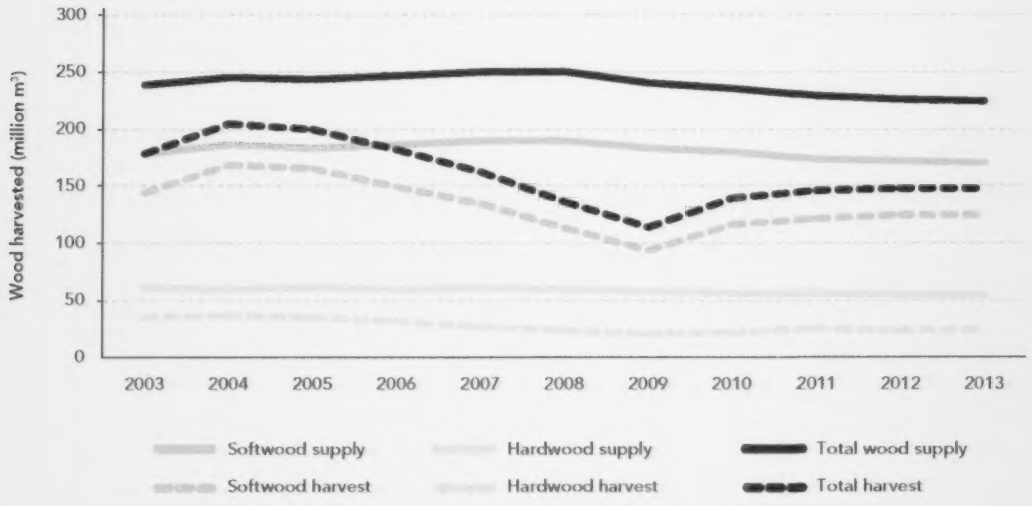
The total volume of timber harvested in 2013 from all jurisdictions (provincial Crown, territorial, private and federal lands) remained unchanged from 2012 levels, at 148 million m^3 – still well below the level of harvest deemed to be sustainable.

What is the outlook?

Given the strong regulatory regimes in place across Canada, harvest levels are expected to remain below the estimated sustainable wood supply. In the medium term, the gap between the volume harvested and the volume deemed to be sustainable is expected to narrow as the global demand for forest products increases.

Provincial Crown land harvests are regulated by allowable annual cuts (AACs). While there is no AAC calculated for Canada as a whole, the aggregate of AACs across all provinces and territories has been relatively constant since 1990. In 2013, only two-thirds of this allowable cut was actually harvested.

Annual harvest versus supply deemed sustainable for harvest, 2003–2013



Source: National Forest Database. See *Sources and information* for more detail.

How does disturbance shape Canada's forests?

Canada's forests are influenced by a range of natural disturbances that vary in severity, extent and frequency. Natural disturbances, such as fires, have occurred in Canada's forests at least since the last glaciation, often renewing whole forest landscapes and shaping forest composition, structure and habitat diversity. Fire, insects, disease, drought and wind storms all affect the forest on an ongoing basis, with their relative importance varying regionally. Climate change is also affecting all these disturbances and, through them, may change future forest landscapes. In the forest, nothing is ever static.

Mature forest cover across Canada's forests is perpetually lost and gained through disturbances, regeneration and growth, but nearly all forest lands remain forest lands. Of the 348 million hectares (ha) of forests, about 45,800 ha, or less than 0.02%, were converted to other land uses in 2012. By contrast, yearly area burned by fires of natural origin averaged 2.2 million ha between 2000 and 2012.

Human disturbances

Human-caused forest disturbances are mostly from harvesting, but also include small areas of deforestation linked to agriculture, energy sectors and other development activities. As with any disturbance, harvesting has an impact on Canada's forests, but ever-evolving forest practices and regulations ensure forest renewal and protect ecosystem services such as air and water purification and carbon cycling.

Natural disturbances

Natural disturbances are part of ecosystem dynamics, but they are also agents of uncertainty for the provision of services to communities and to society in general. Forest fires, for example, can reduce the availability of timber for harvest and can put the safety and health of communities at risk. Severe insect outbreaks are relatively uncommon but may affect extensive areas of forest as they progress over time. Their impact on communities may also be large – for example, through disrupted timber supplies and high control costs. Non-native invasive species and diseases pose unique risks to forests because of their uncertain ecological and socio-economic impacts. Better analysis of these risks is helping researchers and managers identify adaptation opportunities and avenues for increasing the resilience of the forest sector.

Trees damaged by mountain pine beetle in British Columbia.

Affecting the carbon balance

Forest disturbances can also have a major effect on the environmental carbon balance. Forests are a vital part of the carbon cycle, storing and releasing this element in a dynamic process of growth, decay, disturbance and renewal. Forest carbon emissions and removals vary considerably from year to year, mostly because of the annual variability in area burned. Severe insect outbreaks can also have a large, although more gradual, impact on forest carbon emissions. In contrast, forest harvesting generally results in the storage of some of the forest carbon in long-lasting wood products (e.g., wood in houses). These products also reduce emissions when used as construction substitutes for products such as concrete, which take more energy to make.

Source: See *Sources and information* for more detail.

Indicator: Forest fires

Why is this indicator important?

Forest fires present a challenge for forest management because they have the potential to be at once harmful and beneficial. On the one hand, fires can threaten communities and destroy vast amounts of timber resources, resulting in public safety concerns and costly losses. On the other hand, forest fires are a natural part of the forest ecosystem and are important in many parts of Canada for maintaining the health and diversity of the forest. Studying the fire situation across Canada allows land managers to use forest science to reduce fire risk and optimize benefits.

What has changed and why?

In 2014, a total of 5,126 forest fires burned about 4.6 million hectares (ha). While the number of fires was lower than the 10-year average, the area burned was about double the 10-year average. In terms of both numbers of fires and area burned, the busiest months were June, July and August, which is typical for Canada.

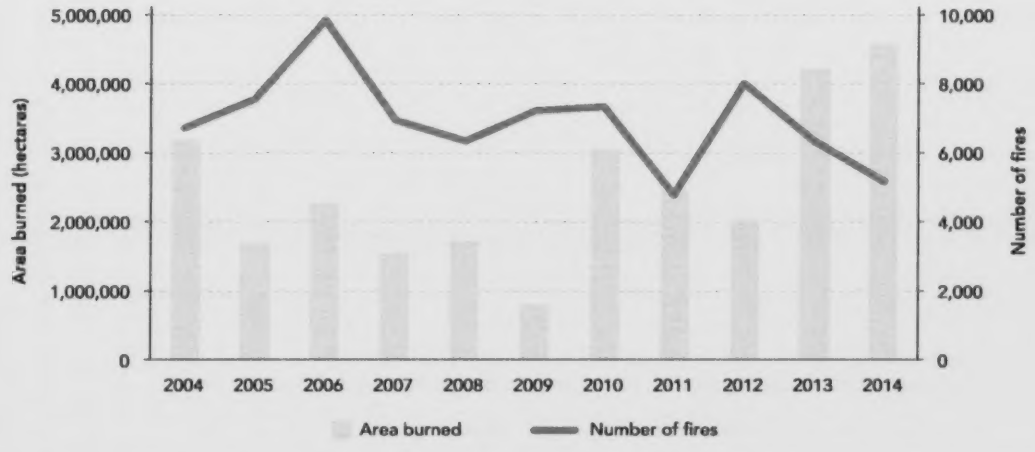
Also in 2014:

- The Northwest Territories, with more than 3 million ha burned, was over 10 times its 10-year average.
- British Columbia, with more than 300,000 ha burned, was a little less than 10 times its 10-year average.
- Atlantic Canada, Quebec, Ontario, Manitoba, Alberta and Yukon were all well below their 10-year averages – in most cases being at or below 20% of 10-year averages of hectares burned.
- Saskatchewan was close to its 10-year average, with more than 340,000 ha burned.
- Forest fires resulted in 19 community evacuations, affecting at least 8,200 people.

What is the outlook?

When and where significant fire activity occurs varies greatly from year to year. Analyses of fire trends are starting to show an increase in both the annual variability of fire seasons and the length of the fire season. More fire activity is now occurring before and after the peak fire months of June, July and August.

Forest area burned and number of forest fires in Canada, 2004–2014



Source: National Forestry Database; Canadian Interagency Forest Fire Centre. See *Sources and information* for more detail.

Indicator: Forest insects

Why is this indicator important?

Forest insects are agents of ecological disturbance because their feeding affects the health of trees. Often these impacts are obvious and easy to document, which makes them useful indicators of change. While disturbance-induced changes may be normal characteristics of healthy forest ecosystems, they can also affect productivity in commercial forests and have a negative impact on environmental values associated with forested landscapes.

What has changed and why?

In 2013, the most recent year for which complete data are available, 20.1 million hectares (ha) of forest were damaged by insects – more than double the area damaged in either 2011 or 2012 – mostly as a result of increases in area of infestation by forest tent caterpillar.

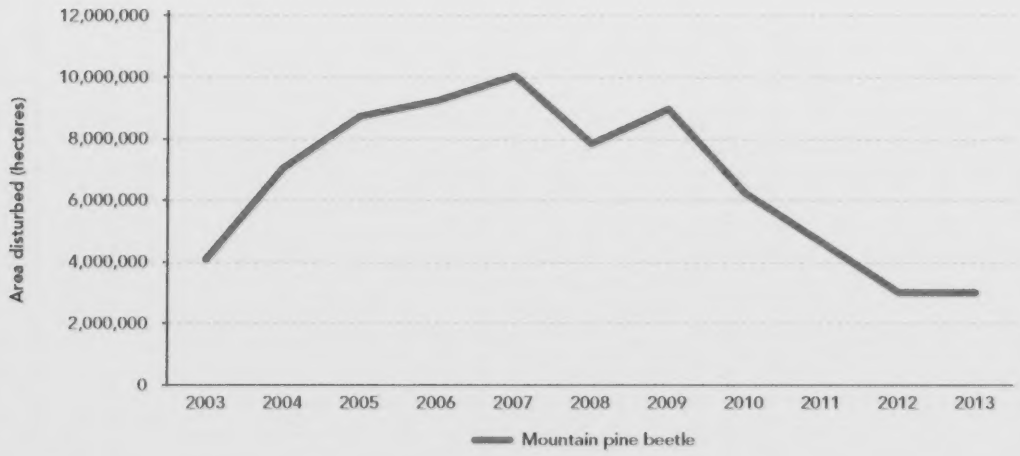
Bark beetles

The area affected by the mountain pine beetle in British Columbia in 2013 remained approximately the same as in 2012, at 3 million ha. Populations continue to infest pine in the expanded range east of the Rocky Mountains in Alberta and the Northwest Territories, following migrations of beetles from British Columbia in 2006 and 2009. Winter mortality in these continental climates is variable and will likely influence year-to-year trends in population levels.

Non-native invasive species

Non-native invasive species, such as gypsy moth and emerald ash borer, remain a special concern because of their novel and uncertain ecological and socio-economic impacts. Non-native species are often pests in urban environments, where their impacts are related to aesthetic, health and community benefits and the cost of control or tree removal rather than to timber values.

Forest area containing mountain pine beetle–killed trees in Canada, 2003–2013*



*The area disturbed by mountain pine beetle is for British Columbia only.

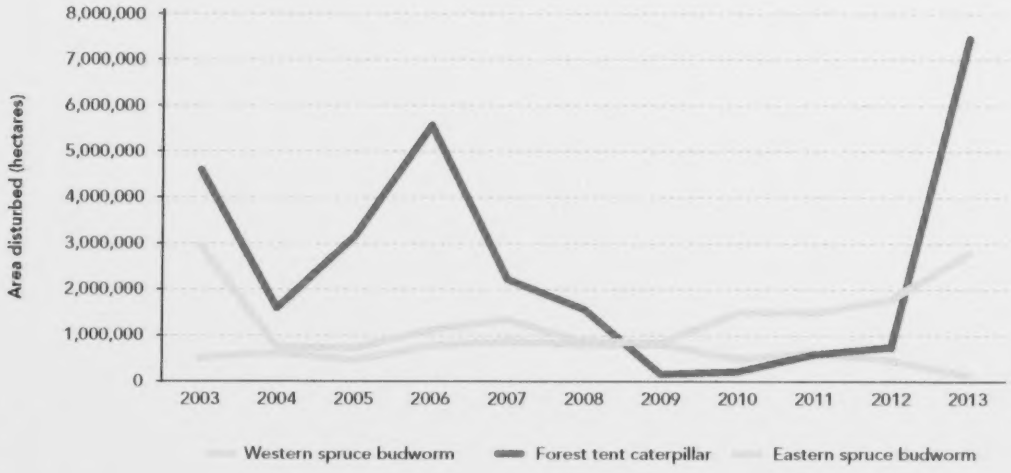
Source: British Columbia Ministry of Forests, Lands and Natural Resource Operations. See *Sources and information* for more detail.

Defoliators

The dramatic increase in overall forest area disturbed by insects in Canada in 2013 was a result of the significant increase in forest tent caterpillar populations in the aspen forests west of the Great Lakes and the continued increase in spruce budworm in Quebec. The area of outbreak of western spruce budworm decreased in British Columbia.

The abundant foliage of the host trees for spruce budworm and forest tent caterpillars sustains population increases, and the resulting defoliation decreases tree growth. If defoliation is severe or persists for several years, tree mortality can occur. The resulting reduction in available food for the insects, in combination with the impacts of natural enemies and diseases, contributes to the eventual decline in outbreaks. Additionally, weather can cause unpredictable changes in populations over larger areas. Regional environmental conditions, such as drought, when they occur with insect infestations, can increase the mortality of affected trees and impede successful regeneration.

Forest area containing defoliated trees for three insects in Canada, 2003–2013



Source: National Forestry Database. See *Sources and information* for more detail.

What is the outlook?

The area of damage by the mountain pine beetle is expected to continue to decline to historical background levels in British Columbia but will persist and spread slowly east of the Rocky Mountains, where susceptible trees and climate permit.

The spruce budworm outbreak in eastern Canada is expected to continue to increase, as is the area treated by forest managers in response to the infestation. The area defoliated by forest tent caterpillar could increase eastward, but outbreaks are relatively short-lived and reductions in intensity and area of infestation should begin to appear in the western portions of the current outbreak.

Indicator: Carbon emissions and removals

Why is this indicator important?

The "carbon cycle" refers to the movement of carbon from the land and water through the atmosphere and living organisms. Carbon in the atmosphere exists as carbon dioxide (CO_2) and is an important greenhouse gas (GHG). Increasing concentrations of GHGs in the atmosphere are linked to climate change.

Forests are an important part of the carbon cycle. They remove carbon from the atmosphere through photosynthesis and store it in their stems, branches and roots. The carbon is released when this material (biomass) dies and decays or when it is burned in forest fires. A forest is considered a "carbon sink" if it absorbs more carbon than it releases. A forest is considered a "carbon source" if it releases more carbon than it absorbs.

Forests play an important role in the global carbon cycle, every year removing about one-quarter of all human fossil fuel emissions from the atmosphere. Carbon emissions and removals from managed forests are an important indicator of the contribution of Canada's forests to the global carbon cycle.

What has changed and why?

In 2013, Canada's managed forests and the forest products sector were a net carbon sink, absorbing 48 million tonnes (Mt) of carbon dioxide equivalent (CO_2e), or 13 million tonnes of carbon (Mt C), from the atmosphere. This is a change from 2012, when 30 Mt CO_2e were emitted. The change is mostly due to lower levels of forest fires in Canada's managed forests in 2013, as well as declines in the area infested by mountain pine beetle.

Canada's managed forests and forest products sector have removed more carbon from the atmosphere than they have emitted in 15 of the 24 years from 1990 to 2013, for a total net sink of 3,599 Mt CO_2e (986 Mt C). Over this period, carbon transferred from forest to society was equivalent to 3,901 Mt CO_2e (or 1,064 Mt C), of which 2,919 Mt CO_2e have been emitted, for a net increase in harvested wood product storage of 938 Mt CO_2e (268 Mt C). In accordance with international reporting rules, this assumes that all wood transferred to landfills is instantly emitted to the atmosphere as CO_2.

What is the outlook?

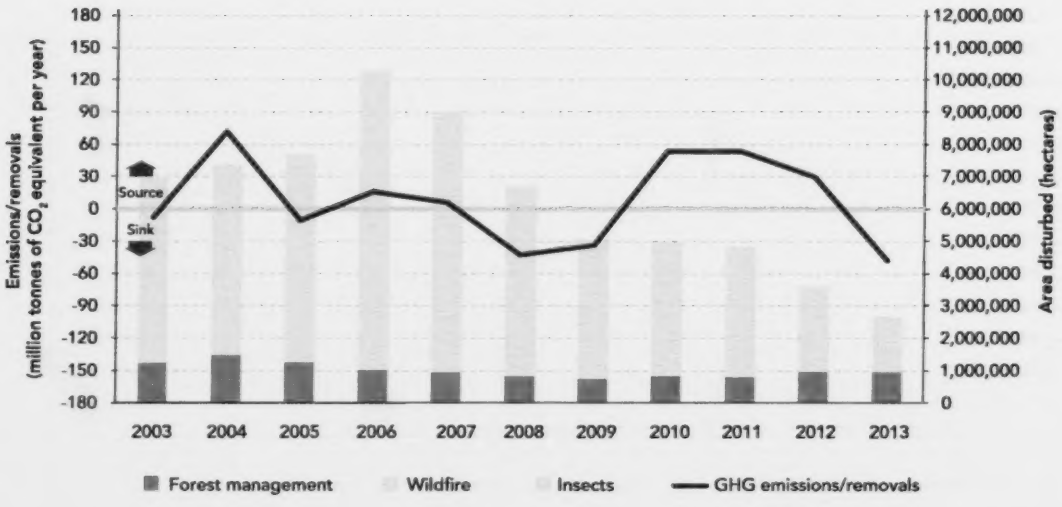
The annual carbon balance of Canada's managed forest varies greatly from year to year, in response to the impacts of natural disturbances, such as fires and insect outbreaks, and changes in harvest rates. The rates of future natural disturbances are inherently difficult to predict, and therefore the outlook for this indicator is difficult to predict. Although the mountain pine beetle impacts in Western Canada continue to decline, the total area burned in 2014 was larger than in 2013, which could lead to a net GHG source in 2014 for Canada's managed forest and forest sector.

Changes to GHG reporting

International GHG reporting rules have changed with respect to harvested wood products. Accordingly, Canada now reports the net GHG balance of forested ecosystems and the net GHG balance from harvested wood products separately. In previous years, all wood removed from the forest was assumed to instantly release all carbon to the atmosphere, despite the long-term storage of carbon in houses and other long-lived wood products. This new reporting convention encourages both the sustainable management of forests and the management of harvested wood products aimed at extending carbon storage.

The changes to GHG reporting have caused the differences in the accompanying graph from previous years.

Carbon emissions and removals in Canada's managed forests, 2003–2013



Source: Natural Resources Canada–Canadian Forest Service calculations; Environment Canada, *National inventory report 1990–2013: Greenhouse gas sources and sinks in Canada*. See *Sources and information* for more detail.

Spotlight: As Canada's climate changes, so will its forests

Canada's forests are not frozen in time; they are dynamic living ecosystems. Climate has always shaped our forests, but questions are being raised about how our forests will evolve given the rapid climate change currently taking place.

Trees in new places

While forest species have always migrated in response to changes in climate, the rate of projected climate change is too fast for certain species to migrate or to adapt. This will inevitably lead to reduced growth or to increased mortality. As different tree species may react differently to a changing climate, new forest assemblages could appear in the future.

Pests in new places

Insect distributions, like those of trees, are determined by climate conditions. But pest species also need the right tree species to feed on. In general, models predict more insect outbreaks as the climate changes. For example, the mountain pine beetle could make inroads into new places, like the boreal jack pine forests. But some pests could migrate faster than their favourite tree species, likely reducing outbreaks in other areas (for example, the spruce budworm in Quebec).

More fires

Fire is an important regeneration agent for Canada's forests. Models project increases in the number of fires and the annual area burned, which could affect people's health and safety. More fire could also result in a younger forest and present new opportunities for activities like harvesting blueberries and mushrooms.

Faster growing trees?

Although there is a lot of uncertainty in projections, warmer weather could increase tree growth for some species in areas that are not limited by water or nutrients, and reduce growth in other species or areas that have constraints.

Future forests will certainly differ from what they are today. The services and benefits that forests provide may be at risk. There is a lot of uncertainty surrounding the impacts of climate change, but incorporating climate change in today's forest management decisions will allow Canada to be better prepared for a different future and positioned to take advantage of new opportunities while mitigating negative impacts. Simply put, we need to adapt.

Current range of aspen

Projected climatic niche of aspen, in 2071–2100

Source: See *Sources and information* for more detail.

Indicator: Forest diseases

Why is this indicator important?

As agents of disturbance in forest ecosystems, forest diseases (caused by pathogens) are major drivers of diversity, shaping forest structure and function. Pathogens also play a major role in decomposition and carbon cycling in Canada's forests. Nevertheless, forest pathogens can cause significant problems when disease increases beyond an acceptable threshold.

What has changed and why?

In managed forests, forest diseases can be detrimental to stand productivity, largely by affecting the rate of growth of the forest.

Some native forest diseases are already widespread, such as Armillaria root disease, which affects about 203 million hectares (ha) of forest with varying intensity. However, the geographic distribution and host range of other forest diseases are expanding. For example, the foliar (leaf) disease Dothistroma needle blight continues to have economic consequences in the forest sector in northern British Columbia and northern Alberta.

Non-native diseases are continuing to cause damage in managed and unmanaged forests. White pine blister rust has caused extensive mortality in eastern and western white pine populations since its establishment in the early 1900s. The disease is also a major threat to the survival of limber pine and whitebark pine in the Rocky Mountains and a contributing factor to their Endangered status. In Quebec, Annosus root disease is spreading northward at a rate of 10 kilometres per year. It has been found in jack pine, white pine and red pine, and has the potential to expand into the boreal forest.

The life cycles and spread of forest diseases are closely regulated by climatic conditions and human activities that enable the transport of disease from one area into another.

In November 2014, limber pine was designated Endangered by the Committee on the Status of Endangered Wildlife in Canada, joining whitebark pine (designated in 2010) on the list of endangered species.

A limber pine in Waterton Lakes National Park infected by white pine blister rust.

What is the outlook?

As climatic suitability for forest pathogens increases through warming or changes in moisture regimes, their geographic range is expected to continue to expand, which will affect trees that were previously free from disease.

Source: See *Sources and information* for more detail.

How do forests benefit Canadians?

Forests and the forest sector play a vital role in the well-being of all Canadians, including those who live in urban areas.

Economic benefits

The forest industry is a major source of income for 1 out of every 7 Canadian census subdivisions. While other natural resource sectors are often regionally concentrated, the forest sector is widely distributed, employing Canadians from coast to coast. In 2014, the forest industry accounted for over 195,000 direct jobs. For many Canadians in rural areas, these jobs are crucial to ensuring their communities' economic sustainability.

The forest industry appears to have emerged from the 2008 economic crisis: both employment and income have been relatively stable for the last few years. In addition to improved job security, the sector also offers job quality: today's forest sector is becoming an increasingly dynamic, progressive place to work. The industry offers foresters, scientists, engineers, computer technologists, technicians and skilled tradespeople long-term career opportunities in a wide variety of well-paid jobs. Thanks to almost 95,000 spin-off jobs created around its industries, the forest sector's economic benefits trickle down through entire local economies.

Environmental and social benefits

Equally significant are the environmental benefits Canadians gain from forests. Trees and other forest plants act as natural cleansers, filtering pollutants from air and water. As well, forests sustain much of the remarkable biological diversity Canada is known for, creating essential habitat for native plant and animal species.

Forests also provide recreational, cultural, traditional and spiritual benefits – whether in wilderness areas, managed stands or urban parks. With 11 million Canadians living in or adjacent to forested areas, these benefits are deeply valued and enjoyed by people across the country.

The benefits of urban forests are also increasingly recognized. In cities, tree cover helps to reduce surface and air temperatures and improve air and water quality. Since a majority of Canadians live in urban areas, these benefits are considerable. For instance, according to a recent TD Economics study, a dollar spent on tree maintenance in Toronto was found to return about $8 in environmental benefits and cost savings (energy, water treatment) each year.

With 70% of Aboriginal communities located in forested regions of Canada, the benefits of forests and the forest sector are especially relevant for Aboriginal people.

Aboriginal people currently account for 4.3% of Canada's total population (2011), but as much as 9% of the total population in forested areas.

Canada's forests provide many opportunities for outdoor recreation, including snowshoeing.

Source: See *Sources and information* for more detail.

Indicator: Employment

Why is this indicator important?

The Canadian forest industry is a major employer nationwide. While the forest industry contributes to the economic, environmental and social welfare of all Canadians, these contributions are particularly crucial in many rural and Aboriginal communities, where forest-related work is often the main source of income.

The forest industry employs people across all 10 provinces and in 2 of the 3 territories. In 2011, forest industry workers accounted for over 10% of the workforce in more than 330 municipalities. The forest sector is truly a national sector, affecting the lives of a broad range of Canadians and communities.

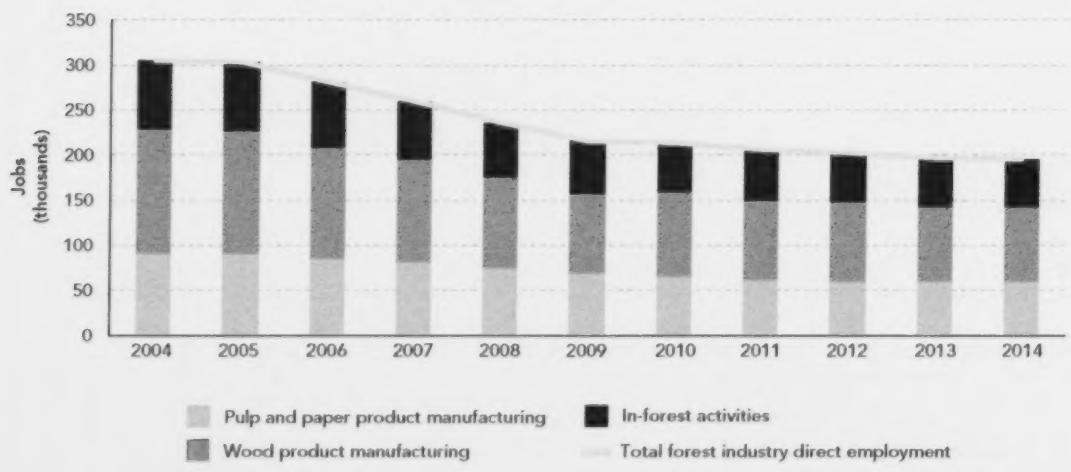
What has changed and why?

In 2014, direct employment in the Canadian forest industry, as measured by Statistics Canada's System of National Accounts, declined from 2013 levels by 0.6%, to 195,015 jobs. This might come as a surprise, as the forest sector's contribution to Canada's gross domestic product (GDP) has increased and the financial indicators are positive. However, the slow recovery has driven forest sector companies to be cautious in expanding capacity and workforce. In addition, British Columbia's timber supply challenges, resulting from the mountain pine beetle outbreak, and the poor market conditions for newsprint have forced several mill closures.

What is the outlook?

The outlook is positive in the lumber and wood panel markets, with demand from the U.S. expected to be strong. This is expected to lead to growing production and employment in these segments. Meanwhile, the Canadian production of pulp and paper products is expected to remain stable at best: while some segments (e.g., market pulp) have been experiencing growth, others (notably graphic paper) continue to decline, challenged by intensifying international competition. Overall, the number of jobs in the forest industry should remain stable or slightly increase in 2015.

Forest industry direct employment, 2004–2014



Source: Statistics Canada, System of National Accounts. See *Sources and information* for more detail.

Indicator: Average earnings

Why is this indicator important?

"Average earnings" calculates the average net annual income per person directly employed in the forest industry. Trends in average earnings indicate the importance of the forest industry to the economy and the social well-being of Canadians, especially when compared with average earnings in other industries.

According to the Council of Ontario Universities *2013 Graduate Survey*, Ontario students graduating with a forestry degree are consistently some of the most employable after graduation, enjoying above-average earnings.

What has changed and why?

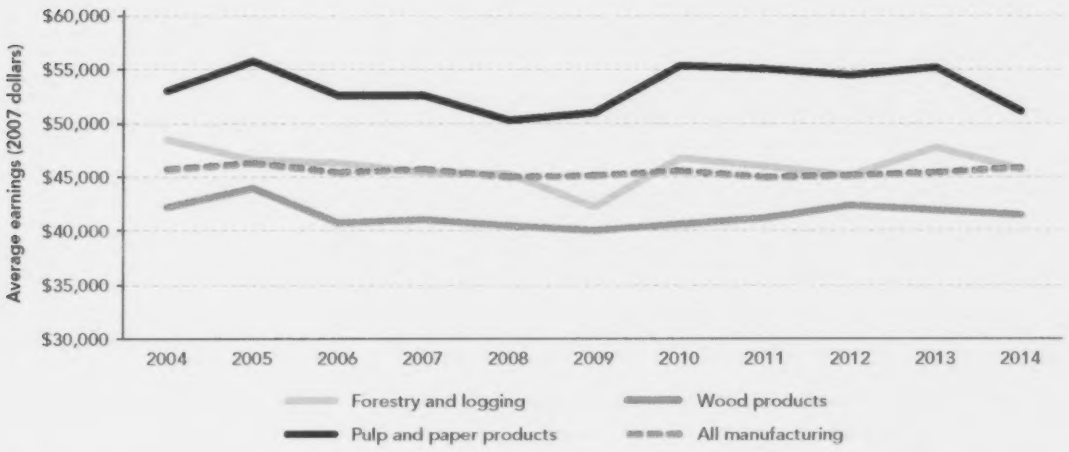
In 2014, average earnings in the forest industry declined from 2013 levels. Earnings remained relatively stable in wood products manufacturing (–0.9%), but weakened significantly in forestry and logging (–4.1%) and in pulp and paper manufacturing (–7.6%). While these declines in earnings may seem surprising given the increase in activity and in profits registered by the sector as a whole in 2014, they are consistent with the sector's employment trends, as producers continued to cautiously manage their labour force.

The decline in forest industry average earnings is different from the trend seen in the Canadian manufacturing sector as a whole, for which earnings actually increased slightly between 2013 and 2014 (+0.9%). However, average earnings in the forest industry remained higher than average earnings for all manufacturing sectors. In 2014, average earnings in the forestry and logging sub-sector were similar to average earnings across all manufacturing sectors, while in the pulp and paper manufacturing sub-sector average earnings were 11% higher.

What is the outlook?

Average earnings in the forest industry will continue to decline as producers continue to try to minimize costs, with the possible exception of the wood products manufacturing sub-sector, where strong market conditions are anticipated. There will also be significant regional variation in earnings as a result of intermittent local labour shortages and surpluses, and pre-existing wage disparities.

Average earnings in the forest industry compared with all manufacturing sectors, 2004–2014



Source: Statistics Canada, Survey of Employment, Payrolls and Hours. See *Sources and information* for more detail.

Indicator: Communities

Why is this indicator important?

The forest sector is important to many communities because it provides employment, income and many health and lifestyle benefits associated with living near trees.

What has changed and why?

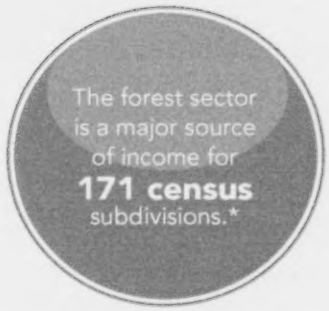
To reflect the importance of forests in providing recreational, cultural, traditional and spiritual benefits in addition to employment and income, the communities indicator has been broadened into three measures. Forest proximity, forest sector income and forest sector Aboriginal employment across Canada together indicate how forests influence the lives of Canadians.

Forests have a significant influence on quality of life for many Canadians. Despite ongoing urbanization, over 11 million Canadians still live in or adjacent to forested areas. In addition, the forest sector is a major economic driver in 171 census subdivisions*, or 14% of all census subdivisions in Canada. The forest sector is also one of the largest employers of Aboriginal people in the country.

In areas where large proportions of workers and revenue are linked to the forest sector, social and economic well-being is highly dependent on the economic strength of the sector. This means that when the forest sector faces challenges, community well-being can suffer.

What is the outlook?

Regions that are heavily dependent on the forest sector have suffered significantly during the forest sector crises of the past decade, and many responded by diversifying their economies, including expanding into non-timber forest-related areas of business, such as recreation, ecotourism and bioenergy. As the forest sector continues to recover, new opportunities are becoming available across Canada, and the forest sector will continue to be important for many Canadians although in a continually evolving form.



*A census subdivision is defined as an "area that is a municipality or an area that is deemed to be equivalent to a municipality for statistical reporting purposes." The change in methodology with previous years means that this indicator cannot be compared to the previous forest-dependent communities indicator.

How does the forest industry contribute to the economy?

The Canadian forest industry is an export-oriented manufacturing sector, accounting for almost 6% of all Canadian exports in 2014 ($31 billion). Traditional forest products form the backbone of the Canadian forest sector: Canada is the world's largest producer of newsprint and northern bleached softwood kraft pulp and the second largest producer of softwood lumber. Over the past 6 years, traditional and other forest products have contributed 8% to 10% of the manufacturing gross domestic product (GDP).

Although it contributes less to total GDP than other resource sectors do, the forest sector is a key contributor to the Canadian economy. For example, the forest sector creates more jobs and contributes more to the balance of trade for every dollar of value added than the minerals and metals sector or the energy sector.

Benefits to Canada's economy, 2014

SECTOR	Contribution to GDP (billions of dollars)	Exports per dollar of value added	Balance of trade per dollar of value added	Employment per million dollars of value added
Forests	$20.81	$1.48	$1.00	9.37
Minerals and metals	$66.89	$1.34	$0.20	5.59
Energy	$180.52	$0.77	$0.47	1.55

Global trade

Trade globalization is changing the market and business environment in which Canadian producers operate, and while it offers new challenges, it also presents tremendous opportunities.

The globalization of trade offers Canadian producers a buffer against the cyclical swings and price volatility that have historically plagued regional markets. In addition, globalization is increasing trade possibilities beyond Canadian producers' traditional markets. Indeed, dependency on the U.S. market has decreased from 78% of forest products exports in 2003 to 65% in 2014. However, this market remains the main destination for Canadian forest products. With the U.S. economic recovery, particularly in residential construction, demand from the U.S. market should continue to galvanize forest sector activities in Canada in the coming years.

Innovation

New and innovative products, materials and services are becoming a more important part of Canada's forest sector. These include new building materials, such as cross-laminated timber; biofuels that can substitute for fossil fuels; and biochemicals that can be used to produce bio-based pharmaceuticals, biodegradable plastics, personal care products and industrial chemicals. The Government of Canada has been supporting forest sector transformation through a number of initiatives, such as the Investments in Forest Industry Transformation program, the Expanding Market Opportunities program and the Forest Innovation program.

Softwood lumber is used in housing construction.

Source: See *Sources and information* for more detail.

Indicator: Gross domestic product

Why is this indicator important?

The gross domestic product (GDP) is the total value of all final goods and services produced annually in a country. It can be thought of as the size of a country's economy. The change in contribution of the forest industry to Canada's GDP is one of the primary indicators used to gauge the health and dynamism of the forest sector. The change in real GDP shows the growth of the forest industry after inflation is factored out – that is, the real year-over-year growth.

What has changed and why?

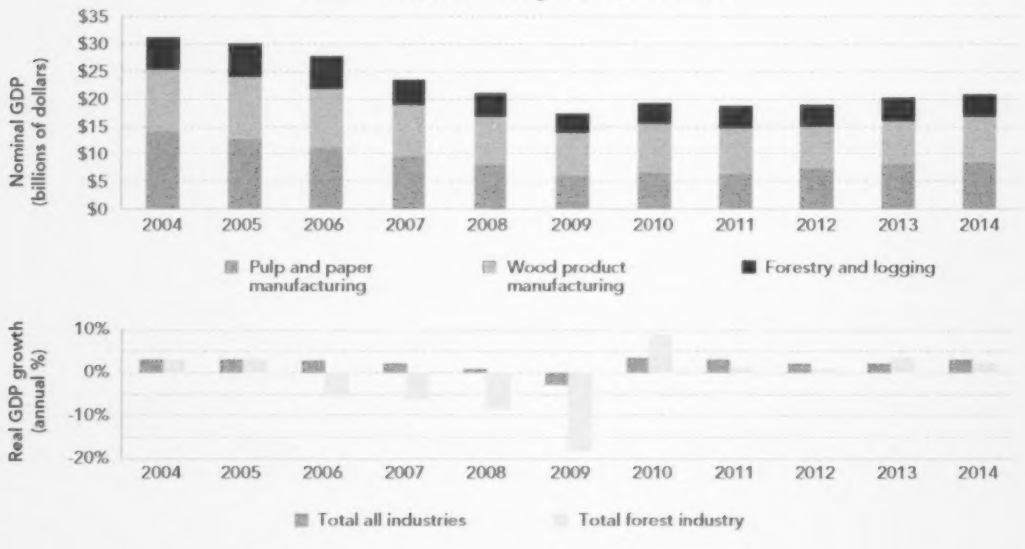
The forest industry contributed $20.8 billion to nominal GDP in 2014. In real terms, the forest industry's GDP increased by 2.5% from 2013 to 2014. However, the growth was lower than the real GDP growth of all Canadian industries together, which increased 3% year-over-year.

Between 2005 and 2009, the forest industry's contribution to GDP declined sharply year-over-year as the sector's economic activity shrank as a result of the U.S. housing crisis and a consumer shift to electronic media. Since its sharp rebound in 2010, the industry's economic evolution has followed the Canadian GDP. As a result, the forest industry has consistently accounted for approximately 1.2% of the total Canadian GDP, with wood product manufacturing offsetting declines in pulp and paper manufacturing.

What is the outlook?

In the short term, increases in the solid wood manufacturing sub-sector will continue to be offset by declines in pulp and paper manufacturing. While oil prices remain low, stable growth in the forest industry coupled with reduced growth in energy-driven sectors could mean that the forest industry's contribution to GDP will grow faster than that of all Canadian industries. The longer-term evolution of the forest industry's contribution to GDP is less clear: fibre supply limitations (e.g., because of the mountain pine beetle infestation) could challenge the industry's growth, yet ongoing industry transformation – aided by current federal initiatives – is expected to add to growth from the development of non-traditional bioproducts, biofuels and bioenergy.

Canadian forest industry's GDP, 2004-2014



Source: Statistics Canada. See *Sources and information* for more detail.

Indicator: Production

Why is this indicator important?

Industrial production reflects the overall economic dynamism of the forest sector. As one of the world's major forest products manufacturers, Canada's forest industry not only meets most of the needs of Canadian consumers, but also supplies nations globally. Production is an important indicator, since it is generally one of the first indicators to respond to economic and market challenges.

What has changed and why?

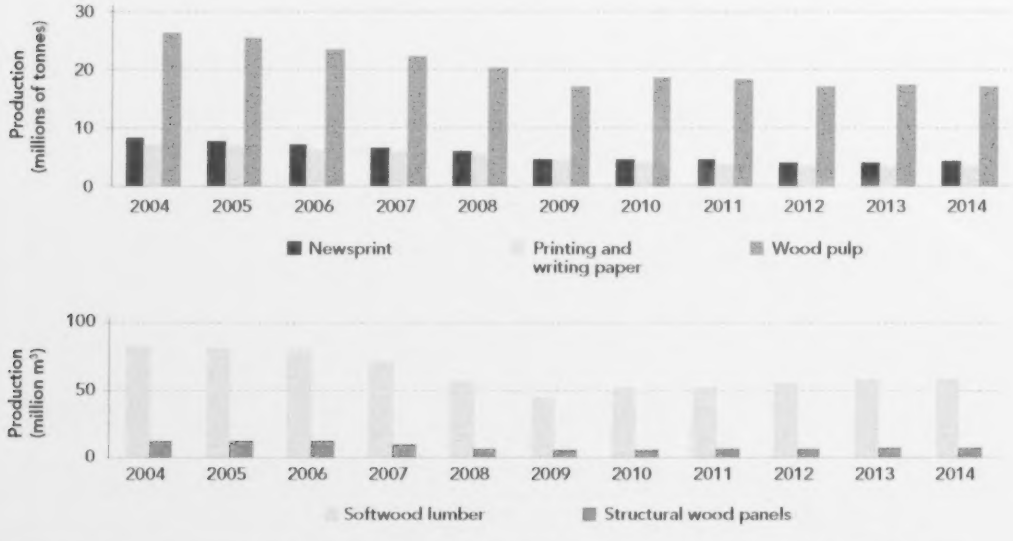
Thanks to the recovery of the U.S. housing sector, the production levels of softwood lumber and structural panels continued to increase, by 1% and 8%, respectively, in 2014, reaching the highest level since the 2008 financial crisis. Pulp and paper production showed mixed results: the production of wood pulp and of printing and writing paper declined by 2% and 6%, respectively, reflecting an ongoing decline in demand in the U.S. and increasing competition. However, newsprint production was up 4%, mainly as a result of the positive impacts of the weakening Canadian dollar against the U.S. dollar on trade.

Canada is the world's largest newsprint producer, the largest producer of northern bleached softwood kraft pulp, the 2nd largest softwood lumber producer, and the 2nd largest wood pulp producer overall.

What is the outlook?

Solid wood production is expected to continue to increase for the foreseeable future, supported by the recovery of U.S. housing starts and solid offshore demand. Pulp and paper production will likely continue to show mixed fortunes, with the consumer segments (household paper and packaging) faring much better than graphic papers (newsprint, printing and writing papers). To some extent, the weakening Canadian dollar will provide a buffer against global economic uncertainties and the continued global shift away from paper-based media to electronic media.

Production of Canadian forest products, 2004–2014



Sources: Lumber – Statistics Canada; panels – APA, The Engineered Wood Association; pulp and paper products – Pulp and Paper Products Council. See *Sources and information* for more detail.

Why is this indicator important?

Forest product exports contribute substantially to the Canadian economy and significantly improve Canada's balance of trade. By value, Canada is the world's leading exporter of softwood lumber, newsprint and chemical wood pulp.

What has changed and why?

In 2014, the value of Canada's forest product exports increased by 9.8% over 2013, rising to $30.8 billion from $28.4 billion.

The U.S. housing recovery continued to drive Canadian softwood lumber exports, although at a slower rate than in previous years. In 2014, softwood lumber exports totalled $8.3 billion, a 16.3% increase over 2013. On the other hand, the value of wood panel exports increased by only 1.2%, to $2.0 billion, despite a 10.7% higher export volume, as 2014 oriented strandboard production outpaced the rise in demand and prices plummeted.

Wood pulp exports increased 7.3% over 2013 levels, to $7.2 billion. Newsprint and printing and writing paper exports are in long-term decline with the rise of electronic media, but a weaker Canadian dollar favoured Canadian producers over their American counterparts. Both product categories saw export growth in 2014, with a 10.2% increase in the value of newsprint exports and a 1.6% increase for printing and writing paper.

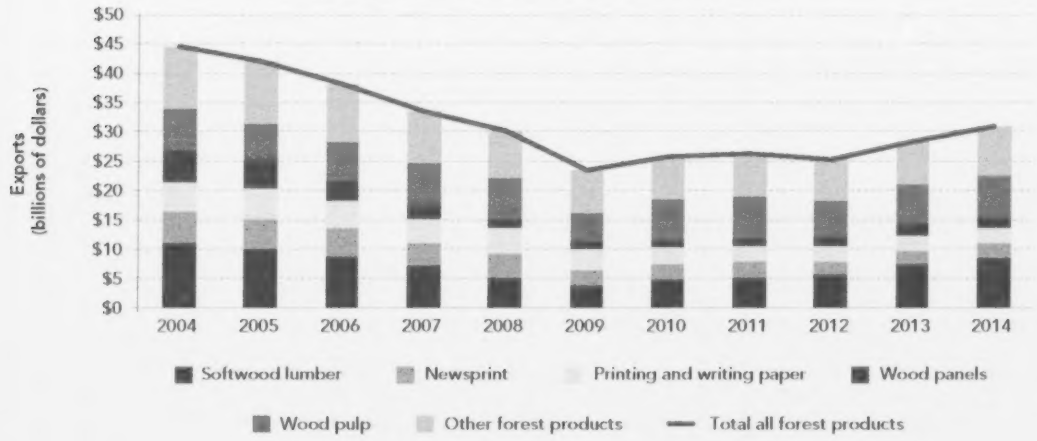
Achoo! In 2014, Canada exported $238 million in facial tissues, used by snifflers around the world.

What is the outlook?

The value of Canadian forest product exports is expected to continue to increase in the short term, with strong demand for solid wood products, packaging and other forest products offsetting the global decline in newsprint and paper demand.

Strong growth of exports to emerging Asian economies has reduced the Canadian forest industry's reliance on U.S. markets, and overseas demand is growing; however, a rebounding of the U.S. economy and slower growth in China will likely support a small reversal of that trend. In 2014, U.S. markets accounted for 65.5% of Canadian forest product exports, compared with 63.7% in 2013 and 78.1% in 2003.

Exports of Canadian forest products, 2004–2014



Source: Statistics Canada. See *Sources and information* for more detail.

How is the forest industry changing?

Canada's forest industry is changing. However, this is not simply a case of entering a new cycle of ups and downs, as is typical of this industry. Rather, it is a structural shift, driven by changes in consumer preference, new markets and innovative products and technology.

Changing markets

This morning, you might have read the news on your computer and not in a newspaper. The Internet and now smartphones have fundamentally altered the way people get information. Canada's forest industry has seen its markets for products such as newspapers, phone books, directories and flyers shrink substantially. Some of the wood fibre that used to go into making paper is now being redirected to other uses. For regions specialized in paper production, this has sometimes resulted in a major contraction of the forest industry, as when a mill closes. However, in regions that concentrate on lumber, the forest industry is doing very well. Finding new ways to use wood fibre and to maximize the value derived from wood has become crucial, and the industry is adapting.

Canada's forest industry is in good health today, as operating incomes remain strong, among the highest in almost a decade. While the recovery of U.S. demand is key to this performance, the industry also has global markets to thank for the high prices it has seen. Indeed, the rapid growth in demand for forest products in emerging economies, such as China, has fundamentally altered the trade landscape over the past 10 years.

Reducing carbon emissions and energy use

In keeping with increasingly environment-conscious business conditions, the forest industry has drastically cut its carbon emissions and energy use since 2001, thanks to a wave of investments that carried the sector over the past few years. The Government of Canada has been actively supporting this transition toward a greener industry. For instance, the 14 projects funded by the Investments in Forest Industry Transformation program over the past 4 years are expected to reduce greenhouse gas emissions by 60 kilotonnes per year and increase Canada's renewable electricity capacity by 7.2 megawatts.

The new multi-use wellness building at the University of British Columbia Okanagan Campus was the first to be constructed using cross-laminated timber for beams. Photo courtesy of Structurlam Products LP.

Adapting to a changing environment

The fundamental need to adapt, the potential offered by new technologies, and the national economic recovery have together prompted many companies in the Canadian forest industry, regardless of their size, to pursue transformative investments. Some investment strategies are focusing on innovative or non-traditional products, many of which are secondary manufacturing products – a segment that will play an important role in the future of the forest sector.

The Canadian forest sector's main challenge will be to keep adapting to its rapidly changing environment, and its ability to do so will determine how healthy it is in the future. However, demand for many forest products, employment and forest fibre value in Canada are expected to rise and will support the sector as the transformation continues.

Source: See *Sources and information* for more detail.

Indicator: Financial performance

Why is this indicator important?

Canada's forest industry contributes significantly to the nation's economy. It is particularly important in many rural communities, where it is a major source of employment opportunities. Good financial performance is not only crucial to the medium-term viability of Canada's forest industry, it also attracts the investment necessary to remain competitive in the long term, maintaining the economic sustainability of local communities. Key measures of the forest industry's financial performance include operating profits and return on capital employed. While high operating profits indicate that an industry's core business activity is in good health, return on capital employed indicates how efficiently the industry is using its capital.

What has changed and why?

The financial performance of the Canadian forest industry continued to be solid in 2014. Although operating profits were slightly down from 2013 (–1%), they still stood at about $2.7 billion in 2014. This is the second-highest operating profit since 2006, representing a significant improvement from the weak financial performance in 2011 and 2012. While the return on capital employed dropped to 5.6% in 2014 from 7% in 2013, it is still well above the long-term average (3.5%) of the past 10 years.

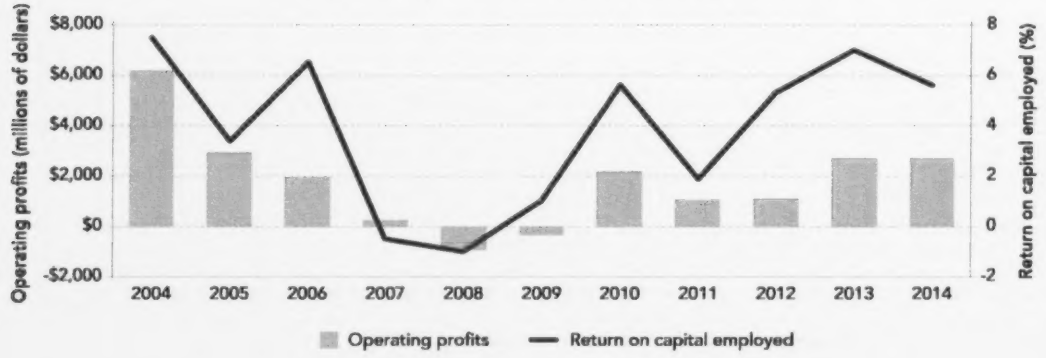
The fourth quarter of 2014 marked, for Canada's forest industry, the 12th consecutive quarter with positive operating profits. The year 2014 recorded the second-highest operating profits since 2006.

The solid financial performance in 2014 was mainly the result of improved market conditions for the sector's major commodities, strong prices and a weaker Canadian dollar that significantly benefited Canadian exporters.

What is the outlook?

Notwithstanding the risks associated with an uncertain global economic outlook, North American and overseas wood product markets are likely to continue to improve in the short to medium term, and to positively affect the financial performance of the forest industry. The recent fall of the Canadian dollar will also help cushion the negative impacts of the falling demand for some products, especially newsprint, enhancing the Canadian forest industry's competitiveness in the global marketplace. Better financial performance will enable the Canadian forest industry to make much-needed strategic investments and thus further improve efficiency in the future.

Financial performance by Canada's forest industry, 2004–2014



Source: Statistics Canada, *Quarterly financial statistics for enterprises*. See *Sources and information* for more detail.

Indicator: Secondary manufacturing

Why is this indicator important?

Secondary manufacturing generates additional employment and revenue, with a corresponding increase in the contribution made by the forest industry to the Canadian economy.

In 2013, sales, exports and domestic consumption of secondary forest products increased over 2012 levels, but still remained below pre-recession highs.

What has changed and why?

In 2012, the secondary wood and paper product industries in Canada generated over $6.2 billion in value-added forest products. This was a small decline from 2011, and 17% less than the high achieved in 2004. The percentage of the total forest product value derived from secondary manufacturing stood at 39% in 2012.

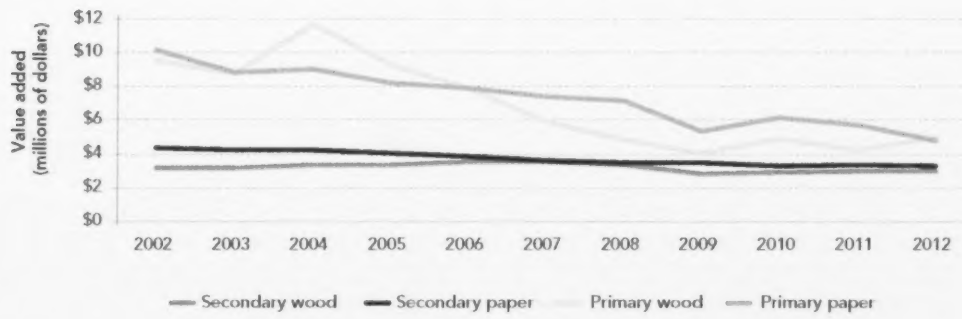
Although the secondary manufacturing sub-sector has declined, it has done relatively better than the primary manufacturing sub-sector, mainly because of its focus on domestic Canadian markets and less exposure to the U.S. and other foreign markets.

The secondary manufacturing of paper began to decline in 2002, largely because of falling paper consumption in North America and because of broader global trends, such as relocation of global manufacturing to developing countries. The secondary wood manufacturing sub-sector began to decline in 2007, undermined by the U.S. housing recession and the broader world recession that followed.

What is the outlook?

A negative outlook for paper demand is expected, given the continuing trend to electronic technology adoption, the shifts in global manufacturing and trade, and the ongoing paper and packaging conservation efforts in North America. On the other hand, the continued U.S. economic recovery – in particular, the strengthening U.S. housing market and steady growth in the Canadian economy – will likely lead to increased demand for secondary wood products over the next five years. Competition from low-cost producers remains a threat in some markets, requiring continued efforts by Canada's forest industry to develop new wood-fibre-based value-added products and expand into new and traditional markets.

Value added from primary and secondary wood and paper product industries, 2002–2012*



*Secondary manufacturing data for 2013 were unavailable at time of publication.

Source: Statistics Canada. See *Sources and information* for more detail.

Indicator: Forest industry carbon emissions

Why is this indicator important?

Most experts agree that there is a strong link between climate change and activities that burn fossil fuels and emit carbon dioxide, methane, nitrous oxide and other GHGs. Monitoring the forest industry's GHG emissions is a necessary step in continuing to improve its emissions record. As well, Canada annually measures its national emission levels for all sectors and assesses how these compare with targets for GHG reductions.

Bioenergy accounted for 56% of forest industry energy use in 2012, up from 49% in 2000.

The forest industry's reduced use of refined petroleum products and natural gas between 2000 and 2012 accounted for 95% of its reduction in direct emissions over the same time period.

What has changed and why?

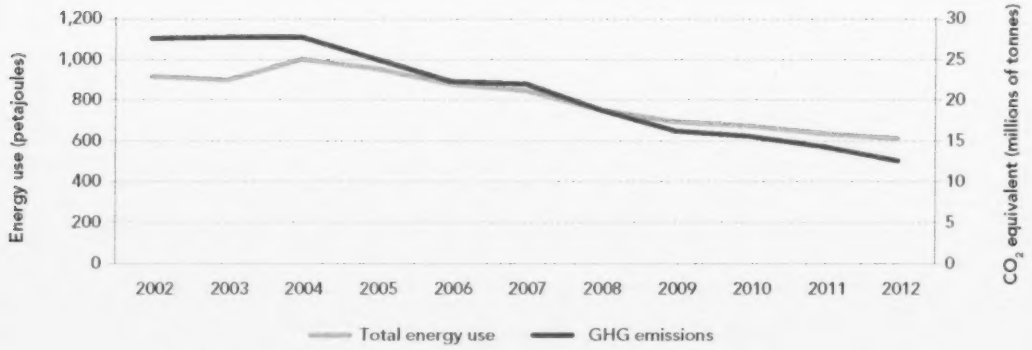
A changing energy mix, greater energy efficiency and the decline in the Canadian pulp and paper manufacturing sub-sector have clearly reduced energy use and GHG emissions in the forest industry. The forest industry's substantial cut in fossil fuel use between 2000 and 2012 has helped reduce direct emissions by 56% and total energy use by 30%.

Some of this decline can be attributed to the contraction of the forest industry between 2005 and 2009. A large part of it, however, is a result of changing energy usage and increases in the self-generation of power from waste products.

What is the outlook?

Investments in technologies that reduce energy use and GHG emissions are expected to continue. Such technologies have significant environmental benefits and also reduce energy costs for manufacturers. The expected rebound in economic activity, however, will somewhat temper efficiency gains on overall GHG emissions. As a result, GHG emissions and total energy use will likely continue to decline, but at a slower rate.

Fossil fuel greenhouse gas emissions and total energy use in Canada's forest industry, 2002–2012



Source: Statistics Canada. See *Sources and information* for more detail.

Statistical profiles

Canada

Population (January 2015)	**35,702,707**
Arboreal emblem	Maple
FOREST INVENTORY	
Forest area by classification (hectares)	
Forest land	347,575,750
Other wooded land	40,865,660
Other land with tree cover	8,498,940
Total area	**396,940,350**
Forest area change (hectares, 2013)	
Afforestation	Not available
Deforestation	45,800
Forest type (forest land only)	
Coniferous	67.8%
Mixedwood	15.8%
Broadleaf	10.5%
Temporarily non-treed	5.9%
Growing stock (million cubic metres)	
Total volume	**47,320**
Forest ownership	
Provincial	76.6%
Territorial	12.9%
Private	6.2%
Aboriginal	2.0%
Federal	1.6%
Municipal	0.3%
Other	0.4%
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	20,129,334
Fire (2014)	
Area burned (hectares)	4,563,848
Number of fires	5,127

FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	738,836
Volume harvested (cubic metres)	152,076,000
Regeneration (hectares, 2013)	
Area planted	387,395
Area seeded	10,492
Third-party certification (hectares, 2014)	
Area certified	160,856,360
Protected forest (IUCN categories)	
I a Strict nature reserve	0.1%
I b Wilderness area	1.9%
II Ecosystem conservation and protection	4.2%
III Conservation of natural features	0.5%
IV Conservation through active management	0.2%
V Landscape conservation and recreation	0.02%
GREENHOUSE GAS INVENTORY	
For forest lands affected by land-use change (2013)	
Removals from the atmosphere due to afforestation (CO_2e/yr, megatonnes)	0.6
Emissions due to deforestation (CO_2e/yr, megatonnes)	3.1
For managed forests (2013)	
Area of managed forests (hectares)	232,000,000
Net removals due to forest biomass and dead organic matter (CO_2e/yr, megatonnes)	143.0
Net emissions to the atmosphere (CO_2e/yr, megatonnes)	-19.0

DOMESTIC ECONOMIC IMPACT	
Canadian housing starts (2014)	189,329
Contribution to nominal GDP (current dollars, 2014)	
Forestry and logging industry	4,137,000,000
Pulp and paper product manufacturing industry	8,138,000,000
Wood product manufacturing industry	8,533,000,000
Total contribution to nominal GDP	**20,808,000,000**
Contribution to real GDP (constant 2007 dollars, 2014)	
Forestry and logging industry	3,830,000,000
Pulp and paper product manufacturing industry	6,998,000,000
Wood product manufacturing industry	9,308,000,000
Total contribution to real GDP	**20,136,000,000**
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	8,565,752,000
Pulp and paper product manufacturing	23,140,129,000
Wood product manufacturing industry	21,454,027,000
Total revenue from goods manufactured	**53,159,908,000**

FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	232,700
Survey of Employment, Payrolls and Hours	185,611
Canadian System of National Accounts	195,015
Direct and indirect employment	288,669
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	1,363,229,000
Pulp and paper manufacturing industry	3,358,417,000
Wood product manufacturing industry	3,935,149,000
Total wages and salaries	**8,656,795,000**

TRADE	
Balance of trade (total exports, dollars, 2014)	20,713,209,235
Value of exports (dollars, 2014)	
Primary wood products	1,301,203,443
Pulp and paper products	16,839,424,399
Wood-fabricated materials	12,633,143,321
Total value of exports	**30,773,771,163**
Value of imports (dollars, 2014)	
Primary wood products	474,245,946
Pulp and paper products	6,528,638,374
Wood-fabricated materials	3,057,677,608
Total value of imports	**10,060,561,928**

DOMESTIC PRODUCTION AND INVESTMENT	
Production (2014)	
Hardwood lumber (cubic metres)	1,459,500
Softwood lumber (cubic metres)	58,158,300
Newsprint (tonnes)	4,014,000
Printing and writing paper (tonnes)	3,268,000
Wood pulp (tonnes)	16,962,000
Structural panels (plywood and oriented strandboard, cubic metres)	7,687,126
Capital expenditures (dollars, 2014)	
Forestry and logging industry	572,900,000
Pulp and paper product manufacturing industry	1,012,200,000
Wood product manufacturing industry	996,900,000
Total capital expenditures	**2,582,000,000**
Repair expenditures (dollars, 2013)	
Forestry and logging industry	434,600,000
Pulp and paper product manufacturing industry	1,088,900,000
Wood product manufacturing industry	914,200,000
Total repair expenditures	**2,437,700,000**

DOMESTIC CONSUMPTION	
Consumption (2014)	
Hardwood lumber (cubic metres)	1,775,792
Softwood lumber (cubic metres)	20,026,762
Newsprint (tonnes)	775,317
Printing and writing paper (tonnes)	1,138,000
Wood pulp (tonnes)	7,680,589
Structural panels (plywood and oriented strandboard, cubic metres)	3,505,089

*Updated data not available at the time of publication. Please visit cfs.nrcan.gc.ca/statsprofile for the most up-to-date information.

See page 69 for background information and sources for the statistics presented in these tables.

British Columbia

Population (January 2015)	4,659,272
Arboreal emblem	Western redcedar
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	7,748,676
Fire (2014)	
Area burned (hectares)	368,785
Number of fires	1,455
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	197,736
Volume harvested (cubic metres)	71,135,000
Regeneration (hectares, 2013)	
Area planted	170,924
Area seeded	Not available
Third-party certification (hectares, 2014)	
Area certified	51,637,088
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	28,356
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	4,022,676,000
Pulp and paper product manufacturing industry	4,441,381,000
Wood product manufacturing industry	7,611,884,000
Total revenue from goods manufactured	**16,075,941,000**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	60,800
Survey of Employment, Payrolls and Hours	48,767
Canadian System of National Accounts	50,570
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	599,458,000
Pulp and paper product manufacturing industry	600,468,000
Wood product manufacturing industry	1,266,901,000
Total wages and salaries	**2,466,827,000**
TRADE	
Balance of trade (total exports, dollars, 2014)	10,549,683,185
Value of domestic exports (dollars, 2014)	
Primary wood products	1,089,891,236
Pulp and paper products	4,265,110,631
Wood-fabricated materials	6,922,478,403
Total value of domestic exports	**12,277,480,270**
Value of imports (dollars, 2014)	
Primary wood products	65,837,057
Pulp and paper products	781,291,062
Wood-fabricated materials	880,668,966
Total value of imports	**1,727,797,085**

Alberta

Population (January 2015)	4,160,044
Arboreal emblem	Lodgepole pine
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	8,704,642
Fire (2014)	
Area burned (hectares)	23,120
Number of fires	1,451
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	87,578
Volume harvested (cubic metres)	22,825,000
Regeneration (hectares, 2013)	
Area planted	70,016
Area seeded	751
Third-party certification (hectares, 2014)	
Area certified	19,372,889
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	40,590
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	850,368,000
Pulp and paper product manufacturing industry	1,613,938,000
Wood product manufacturing industry	2,890,505,000
Total revenue from goods manufactured	**5,354,811,000**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	15,500
Survey of Employment, Payrolls and Hours	18,723
Canadian System of National Accounts	15,650
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	148,553,000
Pulp and paper product manufacturing industry	211,058,000
Wood product manufacturing industry	596,248,000
Total wages and salaries	**955,859,000**
TRADE	
Balance of trade (total exports, dollars, 2014)	2,352,432,984
Value of domestic exports (dollars, 2014)	
Primary wood products	29,670,468
Pulp and paper products	1,744,551,084
Wood-fabricated materials	923,012,347
Total value of domestic exports	**2,697,233,899**
Value of imports (dollars, 2014)	
Primary wood products	6,452,167
Pulp and paper products	179,481,803
Wood-fabricated materials	158,866,945
Total value of imports	**344,800,915**

Saskatchewan

Population (January 2015)	**1,132,640**
Arboreal emblem	White birch
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	109,144
Fire (2014)	
Area burned (hectares)	343,430
Number of fires	403
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	14,562
Volume harvested (cubic metres)	2,914,000
Regeneration (hectares, 2013)	
Area planted	1,671
Area seeded	27
Third-party certification (hectares, 2014)	
Area certified	6,566,095
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	8,257
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	89,660,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	348,019,000
Total revenue from goods manufactured	**Not available**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	2,600
Survey of Employment, Payrolls and Hours	Not available
Canadian System of National Accounts	Not available
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	15,560,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	74,935,000
Total wages and salaries	**Not available**
TRADE	
Balance of trade (total exports, dollars, 2014)	368,049,994
Value of domestic exports (dollars, 2014)	
Primary wood products	2,330,044
Pulp and paper products	214,550,333
Wood-fabricated materials	221,426,653
Total value of domestic exports	**438,307,030**
Value of imports (dollars, 2014)	
Primary wood products	1,392,710
Pulp and paper products	32,384,269
Wood-fabricated materials	36,480,057
Total value of imports	**70,257,036**

Manitoba

Population (January 2015)	**1,289,792**
Arboreal emblem	White spruce
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	307,264
Fire (2014)	
Area burned (hectares)	40,333
Number of fires	245
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	9,078
Volume harvested (cubic metres)	1,267,000
Regeneration (hectares, 2013)	
Area planted	4,333
Area seeded	Not available
Third-party certification (hectares, 2014)	
Area certified	11,119,028
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	6,220
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	42,355,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	417,156,000
Total revenue from goods manufactured	**Not available**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	5,900
Survey of Employment, Payrolls and Hours	Not available
Canadian System of National Accounts	Not available
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	9,852,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	92,570,000
Total wages and salaries	**Not available**
TRADE	
Balance of trade (total exports, dollars, 2014)	-77,516,606
Value of domestic exports (dollars, 2014)	
Primary wood products	398,637
Pulp and paper products	254,344,509
Wood-fabricated materials	132,815,968
Total value of domestic exports	**387,559,114**
Value of imports (dollars, 2014)	
Primary wood products	2,044,096
Pulp and paper products	291,380,836
Wood-fabricated materials	171,650,788
Total value of imports	**465,075,720**

Ontario

Population (January 2015)	**13,733,544**
Arboreal emblem	Eastern white pine
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	416,503
Fire (2014)	
Area burned (hectares)	5,387
Number of fires	303
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	115,358
Volume harvested (cubic metres)	12,600,000
Regeneration (hectares, 2013)	
Area planted	37,609
Area seeded	9,639
Third-party certification (hectares, 2014)	
Area certified	26,819,646
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	59,134
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	944,999,000
Pulp and paper product manufacturing industry	6,574,632,000
Wood product manufacturing industry	3,062,355,000
Total revenue from goods manufactured	**10,581,986,000**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	50,800
Survey of Employment, Payrolls and Hours	37,853
Canadian System of National Accounts	43,955
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	153,045,000
Pulp and paper product manufacturing industry	1,147,373,000
Wood product manufacturing industry	647,652,000
Total wages and salaries	**1,948,070,000**
TRADE	
Balance of trade (total exports, dollars, 2014)	-1,297,602,995
Value of domestic exports (dollars, 2014)	
Primary wood products	39,659,648
Pulp and paper products	2,667,148,225
Wood-fabricated materials	1,191,647,844
Total value of domestic exports	**3,898,455,717**
Value of imports (dollars, 2014)	
Primary wood products	55,059,008
Pulp and paper products	3,914,642,443
Wood-fabricated materials	1,226,357,261
Total value of imports	**5,196,058,712**

Quebec

Population (January 2015)	**8,239,910**
Arboreal emblem	Yellow birch
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	2,639,219
Fire (2014)	
Area burned (hectares)	63,721
Number of fires	293
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	206,774
Volume harvested (cubic metres)	26,384,000
Regeneration (hectares, 2013)	
Area planted	73,785
Area seeded	40
Third-party certification (hectares, 2014)	
Area certified	38,394,408
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	38,810
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	1,945,115,000
Pulp and paper product manufacturing industry	7,838,083,000
Wood product manufacturing industry	5,784,062,000
Total revenue from goods manufactured	**15,567,260,000**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	77,500
Survey of Employment, Payrolls and Hours	59,051
Canadian System of National Accounts	59,080
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	315,905,000
Pulp and paper product manufacturing industry	1,036,310,000
Wood product manufacturing industry	1,015,771,000
Total wages and salaries	**2,367,986,000**
TRADE	
Balance of trade (total exports, dollars, 2014)	6,719,388,959
Value of domestic exports (dollars, 2014)	
Primary wood products	81,009,496
Pulp and paper products	5,991,314,816
Wood-fabricated materials	2,605,083,884
Total value of domestic exports	**8,677,408,196**
Value of imports (dollars, 2014)	
Primary wood products	293,084,385
Pulp and paper products	1,159,862,977
Wood-fabricated materials	505,071,875
Total value of imports	**1,958,019,237**

New Brunswick

Population (January 2015)	**754,260**
Arboreal emblem	Balsam fir
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	4,700
Fire (2014)	
Area burned (hectares)	112
Number of fires	178
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	69,576
Volume harvested (cubic metres)	9,902,000
Regeneration (hectares, 2013)	
Area planted	19,373
Area seeded	Not available
Third-party certification (hectares, 2014)	
Area certified	4,172,881
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	2,276
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	485,510,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	897,477,000
Total revenue from goods manufactured	**Not available**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	11,600
Survey of Employment, Payrolls and Hours	9,179
Canadian System of National Accounts	Not available
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	77,019,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	157,023,000
Total wages and salaries	**Not available**
TRADE	
Balance of trade (total exports, dollars, 2014)	1,358,825,407
Value of domestic exports (dollars, 2014)	
Primary wood products	35,605,146
Pulp and paper products	1,054,221,809
Wood-fabricated materials	518,625,605
Total value of domestic exports	**1,608,452,560**
Value of imports (dollars, 2014)	
Primary wood products	50,334,040
Pulp and paper products	145,396,003
Wood-fabricated materials	53,897,110
Total value of imports	**249,627,153**

Nova Scotia

Population (January 2015)	**943,575**
Arboreal emblem	Red spruce
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	Not available
Fire (2014)	
Area burned (hectares)	565
Number of fires	171
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	29,112
Volume harvested (cubic metres)	3,453,000
Regeneration (hectares, 2013)	
Area planted	5,182
Area seeded	Not available
Third-party certification (hectares, 2014)	
Area certified	1,916,062
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	3,056
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	129,609,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	370,184,000
Total revenue from goods manufactured	**Not available**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	5,600
Survey of Employment, Payrolls and Hours	Not available
Canadian System of National Accounts	Not available
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	28,365,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	67,379,000
Total wages and salaries	**Not available**
TRADE	
Balance of trade (total exports, dollars, 2014)	626,202,860
Value of domestic exports (dollars, 2014)	
Primary wood products	22,610,399
Pulp and paper products	532,381,804
Wood-fabricated materials	113,060,411
Total value of domestic exports	**668,052,614**
Value of imports (dollars, 2014)	
Primary wood products	4,465
Pulp and paper products	17,411,811
Wood-fabricated materials	24,433,478
Total value of imports	**41,849,754**

Prince Edward Island

Population (January 2015)	**146,455**
Arboreal emblem	Red oak
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	96
Fire (2014)	
Area burned (hectares)	3
Number of fires	4
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	2,635
Volume harvested (cubic metres)	360,000
Regeneration (hectares, 2013)	
Area planted	291
Area seeded	Not available
Third-party certification (hectares, 2014)	
Area certified	446
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	511
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	Not available
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	15,679,000
Total revenue from goods manufactured	**Not available**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	400
Survey of Employment, Payrolls and Hours	Not available
Canadian System of National Accounts	Not available
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	Not available
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	3,561,000
Total wages and salaries	**Not available**
TRADE	
Balance of trade (total exports, dollars, 2014)*	6,283,338
Value of domestic exports (dollars, 2014)	
Primary wood products	15,429
Pulp and paper products	6,134,344
Wood-fabricated materials	180,197
Total value of domestic exports	**6,329,970**
Value of imports (dollars, 2014)*	
Primary wood products	Not available
Pulp and paper products	11,003
Wood-fabricated materials	35,629
Total value of imports	**46,632**

Newfoundland and Labrador

Population (January 2015)	**526,329**
Arboreal emblem	Black spruce
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	64,884
Fire (2014)	
Area burned (hectares)	16,816
Number of fires	124
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	5,937
Volume harvested (cubic metres)	1,182,000
Regeneration (hectares, 2013)	
Area planted	4,211
Area seeded	Not available
Third-party certification (hectares, 2014)	
Area certified	1,493,405
DOMESTIC ECONOMIC IMPACT	
Housing starts (2014)	2,119
Revenue from goods manufactured (dollars, 2012)*	
Forestry and logging industry	50,863,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	56,706,000
Total revenue from goods manufactured	**Not available**
FOREST INDUSTRY EMPLOYMENT	
Employment (number, 2014)	
Labour Force Survey	1,800
Survey of Employment, Payrolls and Hours	Not available
Canadian System of National Accounts	Not available
Wages and salaries (dollars, 2012)*	
Forestry and logging industry	14,694,000
Pulp and paper product manufacturing industry	Not available
Wood product manufacturing industry	13,109,000
Total wages and salaries	**Not available**
TRADE	
Balance of trade (total exports, dollars, 2014)	107,135,283
Value of domestic exports (dollars, 2014)	
Primary wood products	12,940
Pulp and paper products	109,599,057
Wood-fabricated materials	4,545,892
Total value of domestic exports	**114,157,889**
Value of imports (dollars, 2014)	
Primary wood products	37,873
Pulp and paper products	6,772,086
Wood-fabricated materials	212,647
Total value of imports	**7,022,606**

Yukon

Population (January 2015)	**36,589**
Arboreal emblem	Subalpine fir
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	5,100
Fire (2014)	
Area burned (hectares)	3,160
Number of fires	34
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	300
Volume harvested (cubic metres)	37,000
Regeneration (hectares, 2013)	
Area planted	Not available
Area seeded	35
Third-party certification (hectares, 2014)	
Area certified	Not available
TRADE	
Balance of trade (total exports, dollars, 2014)	250,737
Value of domestic exports (dollars, 2014)	
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	256,712
Total value of domestic exports	**256,712**
Value of imports (dollars, 2014)	
Primary wood products	0
Pulp and paper products	3,601
Wood-fabricated materials	2,374
Total value of imports	**5,975**

Northwest Territories

Population (January 2015)	**43,595**
Arboreal emblem	Tamarack
DISTURBANCE	
Insects (hectares, 2013)	
Area defoliated by insects and containing beetle-killed trees	129,106
Fire (2014)	
Area burned (hectares)	3,416,291
Number of fires	385
FOREST MANAGEMENT	
Harvesting (2013)	
Area harvested (hectares)	190
Volume harvested (cubic metres)	17,000
Regeneration (hectares, 2013)	
Area planted	Not available
Area seeded	Not available
Third-party certification (hectares, 2014)	
Area certified	Not available
TRADE	
Balance of trade (total exports, dollars, 2014)	21,711
Value of domestic exports (dollars, 2014)	
Primary wood products	0
Pulp and paper products	12,666
Wood-fabricated materials	9,045
Total value of domestic exports	**21,711**
Value of imports (dollars, 2014)	
Primary wood products	0
Pulp and paper products	0
Wood-fabricated materials	0
Total value of imports	**0**

Nunavut

Population (January 2015)	**36,702**
TRADE	
Balance of trade (total exports, dollars, 2014)	54,378
Value of domestic exports (dollars, 2014)	
Primary wood products	0
Pulp and paper products	55,121
Wood-fabricated materials	360
Total value of domestic exports	**55,481**
Value of imports (dollars, 2014)	
Primary wood products	145
Pulp and paper products	480
Wood-fabricated materials	478
Total value of imports	**1,103**

Sources and information

The data in this report are derived from a number of sources, which are identified here by their relevant section. Where necessary, data have been edited for accuracy and consistency. All data are subject to revision.

In most cases, the data represent the year before the reporting period. However, when they are gathered from several sources, it takes longer to analyze and produce them. In these cases, the numbers reflect results from two or three years before the reporting period.

While most figures are calculated for the calendar year, some are based on the federal government's fiscal year (April 1 to March 31). Numbers are rounded off. In the case of employment data, they are rounded to the nearest hundred. All dollar figures, unless specified otherwise, are in Canadian dollars.

It may not be possible to compare directly the data from the various sections, as they come from several sources that may compile their statistics differently from each other.

Sustainability indicators

Introduction

Note

- Additional information can be found at:
  - Cashore, B., and McDermott, C. 2004. *How Canada compares: International review of forest policy and regulation*. Ottawa, ON: Forest Products Association of Canada. **http://www.fpac.ca/publications/2004_HowCanadaCompares.pdf**

How much forest does Canada have?

Sources

- Food and Agriculture Organization of the United Nations. 2010. *Global forest resources assessment*. **http://www.fao.org/docrep/013/i1757e/i1757e.pdf**
- National Forest Inventory. Standard reports, Table 4.1, Area of forest and non-forest land by terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T4_FOR_AREA_en.html**
- Wulder, M.A., Campbell, C., et al. 2007. National circumstances in the international circumboreal community. *Forestry Chronicle* 83, 539–556. **http://pubs.cif-ifc.org/doi/abs/10.5558/tfc83539-4**

Indicator: Forest area

Sources

- National Forest Inventory. Standard reports, Table 4.1, Area of forest and non-forest land by terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T4_FOR_AREA_en.html**
- National Forest Inventory. Standard reports, Table 5.1, Area of forest land by forest type, age class and terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T5_FORAGE20_AREA_en.html**

Notes

- Five countries have more forest per capita than Canada: French Guiana, Suriname, Guyana, Gabon and Niue.
- Additional information can be found at:
  - Johnston, M., Campagna, M., et al. 2009. *Vulnerability of Canada's tree species to climate change and management options for adaptation: An overview for policy makers and practitioners.* Ottawa, ON: Canadian Council of Forest Ministers. **http://cfs.nrcan.gc.ca/publications?id=30276**
  - Natural Resources Canada–Canadian Forest Service. Changing climate, changing forest zones. **http://www.nrcan.gc.ca/forests/climate-change/13093**
  - Price, D.T., Alfaro, R.I., et al. 2013. Anticipating the consequences of climate change for Canada's boreal forest ecosystems. *Environmental Reviews* 21, 322–365. **http://cfs.nrcan.gc.ca/publications?id=35306**

Indicator: Wood volume

Sources

- National Forest Inventory. Standard reports, Table 16.1, Total tree volume by species group, age class and terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T16_LSAGE20_VOL_en.html**
- National Forestry Database. Wood supply – National tables, Table 2.1, Graph B, Wood supply by ownership, latest period calculated, 2013. **http://nfdp.ccfm.org/data/graphs/graph_21_b_e.php**
- National Forestry Database. Wood supply – National tables, Table 2.1, Graph C, AAC vs. actual harvest, provincial crown land – industrial roundwood, 1990–2013. **http://nfdp.ccfm.org/data/graphs/graph_21_c_e.php**

Indicator: Deforestation and afforestation

Source

- Environment Canada. 2015. National inventory report 1990–2013: Greenhouse gas sources and sinks in Canada. **http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php**

Notes

- National deforestation estimates are calculated on a periodic basis using the method described in the national deforestation monitoring system description report. Deforestation estimates by sector for 2015 will be available in the indicator table in *The State of Canada's Forests* report after 2017. For more information, see:
  - Dyk, A., Leckie, D., et al. 2015. *Canada's national deforestation monitoring system: System description.* Victoria, BC: Natural Resources Canada–Canadian Forest Service. **http://cfs.nrcan.gc.ca/publications?id=36042**
- Environment Canada, 2014, *National Inventory Report*, is based on Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Report System data and analysis.
- All values reported are for the listed year.

- Forestry numbers result from the creation of permanent forestry access roads.
- Hydroelectric numbers exclude reservoirs. Refer to the indicator text for magnitudes of deforestation due to reservoir flooding.
- Industry and transportation numbers include mines, gravel pits, oil and gas infrastructure, and highway construction.
- Municipal numbers include urban development.
- Recreation numbers include ski hills and golf courses.
- Total numbers are adjusted for rounding.

Spotlight: Canada's forests in a global context

Sources

- Food and Agriculture Organization of the United Nations. 2012. *Guide for country reporting for FRA 2015* (Forest Resources Assessment Programme 2015 Working Paper). **http://www.unece.org/fileadmin/DAM/timber/docs/sfm/October_workhops_2013/Guidelines_FRA2015.pdf**
- National Forest Inventory. Standard reports, Table 12.1, Area of forest land by ownership and terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T12_FOROWN_AREA_en.html**

Notes

- Additional information about the Food and Agriculture Organization of the United Nations (FAO) Global Forest Resource Assessment and Canada's past country reports can be found at **http://www.fao.org/forestry/fra/fra2010/en/**
- The FAO's 2015 Global Forest Resources Assessment will be available at **http://www.fao.org/forestry/fra/fra2015/en/**
- Additional information about the World Forestry Congress can be found at **http://www.fao.org/about/meetings/world-forestry-congress/en/**

How much timber is harvested, and is harvesting done sustainably?

Sources

- National Forest Inventory. Standard reports, Table 16.1, Total tree volume by species group, age class and terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T16_LSAGE20_VOL_en.html**
- National Forestry Database. Wood supply – National tables, Table 2.1, Graph A, Wood supply vs. actual harvest, industrial roundwood, 1970–2013. **http://nfdp.ccfm.org/data/graphs/graph_21_a_e.php**
- National Forestry Database. Wood supply – National tables, Table 2.1, Graph B, Wood supply by ownership, latest period calculated, 2013. **http://nfdp.ccfm.org/data/graphs/graph_21_b_e.php**

Note

- British Columbia accounts for just over 40% of Canada's aggregated AAC. Quebec and Ontario together account for 31%, and the Prairie provinces and the Atlantic region for about 25% and 4%, respectively.

Indicator: Area harvested

Source

- National Forestry Database. Silviculture – National tables, Table 6.2, Area harvested by ownership, harvesting method and province/territory, 1990–2014. **http://nfdp.ccfm.org/data/compendium/html/comp_62e.html**

Notes

- Data include provincial Crown and private forest land subject to even-aged management (clearcutting), uneven-aged management (selection cutting), and commercial thinning harvest methods.
- Graph does not display federal lands because their small area cannot be represented at the given scale.

Indicator: Regeneration

Sources

- National Forestry Database. Silviculture – National tables, Table 6.2, Area harvested by ownership, harvesting method and province/territory, 1990–2014. **http://nfdp.ccfm.org/data/compendium/html/comp_62e.html**
- National Forestry Database. Silviculture – National tables, Table 6.6, Area of direct seeding by ownership and province/territory, 1990–2014. **http://nfdp.ccfm.org/data/compendium/html/comp_66e.html**
- National Forestry Database. Silviculture – National tables, Table 6.7, Area planted by ownership, species, and province/territory, 1990–2013. **http://nfdp.ccfm.org/data/compendium/html/comp_67e.html**

Notes

- Data are for forests on Crown lands across Canada.
- Federally and privately owned lands are excluded.

Indicator: Volume harvested relative to the sustainable wood supply

Source

- National Forestry Database. Wood supply – National tables, Table 2.1, Graph A, Wood supply vs. actual harvest, industrial roundwood, 1970–2013. **http://nfdp.ccfm.org/data/graphs/graph_21_a_e.php**

Notes

- Harvests include industrial roundwood only and exclude fuel wood and firewood.
- Wood supply includes allowable annual cuts (AACs) for provincial Crown lands and potential harvests for federal and private lands.

How does disturbance shape Canada's forests?

Sources

- Environment Canada. 2015. National inventory report 1990–2013: Greenhouse gas sources and sinks in Canada. **http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php**

- National Forestry Database. Forest fires – National tables, Table 3.1, Area burned, 1970–2014. **http://nfdp.ccfm.org/data/graphs/graph_31_b_e.php**

Indicator: Forest fires

Sources

- Canadian Interagency Forest Fire Centre. 2014. *Canada report 2014.* **http://www.ciffc.ca/images/stories/pdf/2014_canada_report.pdf**
- National Forestry Database. Forest fires – National tables, Table 3.1, Forest fire statistics by province/territory/agency, 1990–2013. **http://nfdp.ccfm.org/data/compendium/html/comp_31e.html**

Indicator: Forest insects

Sources

- British Columbia Ministry of Forests, Lands and Natural Resource Operations. Forest health conditions – 2013 aerial overview survey summary table. **http://www2.gov.bc.ca/gov/DownloadAsset?assetId=32425BEF95C345A9B582A20F6DEEAD43&filename=2013_forest_health_summary_table.pdf**
- National Forestry Database. Forest insects – National tables, Table 4.1, Area within which moderate to severe defoliation occurs including area of beetle-killed trees by insects and province/territory, 1975–2014. **http://nfdp.ccfm.org/data/compendium/html/comp_41e.html**

Notes

- The area disturbed by mountain pine beetle includes only British Columbia.
- Forest area disturbed by defoliators includes only areas with tree mortality and moderate to severe defoliation. Defoliation does not always imply mortality. For example, stands with moderate defoliation often recover and may not lose much growth.
- Defoliation is mapped on an insect species basis, and a given area may be afflicted by more than one species at a time. This may result in double or triple counting in areas affected by more than one species, exaggerating the extent of the total area defoliated.

Indicator: Carbon emissions and removals

Source

- Environment Canada. 2015. *National inventory report 1990–2013: Greenhouse gas sources and sinks in Canada.* (Based on data provided by Natural Resources Canada.) **http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8108.php**

Notes

- This indicator is estimated annually using Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Report System. The system integrates information about forest inventories, forest growth, natural disturbances, forest management activities and land-use change to evaluate carbon stocks, stock changes and emissions of non-CO_2 greenhouse gases in Canada's managed forests. The system also estimates transfers to the forest product sector and the fate of harvested wood products manufactured from wood harvested in Canada, including emissions resulting from these products.

- "Managed land" includes all lands managed for production of wood fibre or wood-based bioenergy, for protection from natural disturbances, or for the conservation of ecological values. Within those managed lands, "forest" includes all areas of 1 hectare or more having the potential to develop forest cover, with a minimum crown closure of 25% and a minimum tree height of 5 metres at maturity in situ.
- Insect-affected areas shown in the figure include only those areas affected with enough severity to have a substantial impact on national forest carbon emissions and removals.
- Harvested wood product emissions are estimated using the "Production Approach" of the Intergovernmental Panel on Climate Change (IPCC) and include annual emissions from all wood harvested in Canada since 1961, regardless of its current location. Transfers of wood and paper products to landfills are assumed to instantly oxidize as CO_2.
- The results reported here differ from those of the national GHG inventory reporting, which, starting in 2015, includes emissions from domestic firewood use and attributes these to the forest sector. For the purposes of this report, harvest residues that might be used for domestic firewood are assumed to decompose in the forest.
- Additional information can be found at:
  - Kurz, W.A., Shaw, C.H., et al. 2013. Carbon in Canada's boreal forest: A synthesis. *Environmental Reviews* 21, 260–292. **http://cfs.nrcan.gc.ca/publications?id=35301**
  - Stinson, G., Kurz, W.A., et al. 2011. An inventory-based analysis of Canada's managed forest carbon dynamics, 1990 to 2008. *Global Change Biology* 17, 2227–2244. **http://cfs.nrcan.gc.ca/publications?id=32135**
  - Lemprière, T.C., Kurz, W.A., et al. 2013. Canadian boreal forests and climate change mitigation. *Environmental Reviews* 21, 293–321. **http://cfs.nrcan.gc.ca/publications?id=35627**

Spotlight: As Canada's climate changes, so will its forests

Notes

- The map of projected climatic niche for aspen is based on Representative Concentration Pathway 8.5 and Canada's Plant Hardiness Zone climate change models, available at **http://www.planthardiness.gc.ca/**
- Additional information can be found at:
  - Johnston, M., Campagna, M., et al. 2009. *Vulnerability of Canada's tree species to climate change and management options for adaptation: An overview for policy makers and practitioners*. Ottawa, ON: Canadian Council of Forest Ministers. **http://cfs.nrcan.gc.ca/publications?id=30276**
  - Natural Resources Canada–Canadian Forest Service. Changing climate, changing forest zones. **http://www.nrcan.gc.ca/forests/climate-change/13093**
  - Price, D.T., Alfaro, R.I., et al. 2013. Anticipating the consequences of climate change for Canada's boreal forest ecosystems. *Environmental Reviews* 21, 322–365. **https://cfs.nrcan.gc.ca/publications?id=35306**
  - Ste. Marie, C. (compiler). 2014. Adapting sustainable forest management to climate change: A review of assisted tree migration and its potential role in adapting sustainable forest management to climate change. Ottawa, ON: Canadian Council of Forest Ministers. **http://cfs.nrcan.gc.ca/publications?id=35868**

Indicator: Forest diseases

Sources

- Committee on the Status of Endangered Wildlife in Canada. **http://www.cosewic.gc.ca**
- Hutchison, T. 2013. Red band needle blight at ATISC. *Bugs and Diseases* 24, 1–2. **http://esrd.alberta.ca/lands-forests/forest-health/forest-pests/bugs-diseases/documents/BugsDiseasesNewsletter-Apr2013.pdf**
- Laflamme, G. 2013. Spread of *Heterobasidion irregulare* in eastern Canada towards northern natural forests of *Pinus banksiana*. In Capretti, P., Comparini, C., et al. (eds.), *Proceeding of the XIII International Conference on Root and Butt Rot of Forest Trees*, Florence, Italy, September 4–10, 2012, 162–163.
- Smith, C.M., Langor, D.W., et al. 2013. Changes in white pine blister rust infection and mortality in limber pine over time. *Canadian Journal of Forest Research* 43, 919–928.
- Smith, C.M., Shepherd, B., et al. 2013. Changes in blister rust infection and mortality in whitebark pine over time. *Canadian Journal of Forest Research* 43, 90–96.
- Woods, A., Coates, K.D., et al. 2005. Is an unprecedented Dothistroma needle blight epidemic related to climate change? *BioScience* 55, 761–769.

How do forests benefit Canadians?

Sources

- Aboriginal Affairs and Northern Development Canada, communities georeferenced by postal code.
- Alliance for Community Trees. 2011. *Benefits of trees and urban forests: A research list.* **http://www.actrees.org/files/Research/benefits_of_trees.pdf**
- Health Canada. 2009 (revised 2010). The urban heat island effect: Causes, health impacts and mitigation strategies. *Climate Change and Health: Adaptation Bulletin* 1, 1–2. **http://www.hc-sc.gc.ca/ewh-semt/pubs/climat/adapt_bulletin-adapt1/index-eng.php**
- Health Canada. Air pollution and health. **http://www.hc-sc.gc.ca/ewh-semt/air/out-ext/health-sante/index-eng.php**
- Statistics Canada. 2011 Census of Population.
- Statistics Canada. Labour Force Survey (special extraction).
- TD Economics. 2014. *Urban forests: The value of trees in the City of Toronto* (special report). **http://www.td.com/document/PDF/economics/special/UrbanForests.pdf**

Indicator: Employment

Sources

- Statistics Canada. CANSIM table 383-0031: Labour statistics consistent with the System of National Accounts (SNA), by province and territory, job category and North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3830031&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Statistics Canada. 2011 Census of Population.

Notes

- Municipalities refer to Statistics Canada census subdivisions (CSD). **http://www12.statcan.gc.ca/census-recensement/2011/ref/dict/geo012-eng.cfm**
- The System of National Account (SNA) is the official source of employment data for NRCan. See NRCan's Key Facts and Figures on the Natural Resources Sector for the most up-to-date SNA employment data. **http://www.nrcan.gc.ca/publications/key-facts/16013**

Indicator: Average earnings

Sources

- Council of Ontario Universities. 2014. *2013 Graduate survey*. **http://cou.on.ca/publications/reports/pdfs/2013-graduate-survey---final**
- Statistics Canada. CANSIM table 281-0027: Average weekly earnings (Survey of Employment, Payrolls and Hours), by type of employee for selected industries classified using the North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810027&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Statistics Canada. CANSIM table 380-0102: Gross domestic product indexes. **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3800102&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**

Notes

- Additional information can be found at:
  - Natural Resources Canada–Canadian Forest Service. 2013. Skilled trade shortages – a regional issue. *Selective Cuttings* (June 11, 2013). **http://cfs.nrcan.gc.ca/selective-cuttings/12**
  - Natural Resources Canada–Canadian Forest Service. Industry – Overview. **http://www.nrcan.gc.ca/forests/industry/13311**
- Data exclude overtime.

Indicator: Communities

Source

- Natural Resources Canada–Canadian Forest Service's calculations based on Statistics Canada, 2011 Census of Population and Labour Force Survey.

Notes

- This indicator establishes a standard against which to measure this aspect of the sector in future years. It is important to note that a decline in the indicator can reflect either a decline in the fortunes of the forest sector (e.g., if a mill closes, the income from the forest sector goes down) or an increase in diversification of the economy (e.g., no changes to the forest sector income, but other sources of income increase). As a result, an increasing or declining trend in the number of census subdivisions with the forest sector as a major economic driver will be hard to interpret in the absence of other information.
- A "forested area" is defined as an area with over 60% tree cover.
- All communities indicators are now based on Statistics Canada's census subdivisions, which are defined as an "area that is a municipality or an area that is deemed to be equivalent to a municipality

for statistical reporting purposes (e.g., as an Indian reserve or an unorganized territory)." Since there is no standardized definition of "community" across provinces and territories, adopting the use of census subdivisions ensures consistency in reporting over time. Census subdivisions therefore do not correspond to the definitions of communities used for the previous forest-dependent communities indicator.

- The forest sector is considered to be a major economic driver if it directly accounts for 20% or more of total income in a census subdivision. This differs from the previous definition of forest dependence which was predicated on having over 50% of total income – including transfer income – directly attributable to the forest sector.

How does the forest industry contribute to the economy?

Sources

- Statistics Canada. CANSIM table 383-0031: Labour statistics consistent with the System of National Accounts (SNA), by province and territory, job category and North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3830031&paSer=&pattern=&stByVal=1&p1=1&p2=50&tabMode=dataTable&csid=**
- Statistics Canada. Merchandise trade data, monthly data (special extraction).
- Natural Resources Canada's calculations based on Statistics Canada's CANSIM table 379-0031: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), monthly (dollars); and NRCan estimated industry price deflators.

Note

- The energy sector metrics exclude coal and uranium mining activities.

Indicator: Gross domestic product

Sources

- Natural Resources Canada's calculations based on Statistics Canada's CANSIM table 379-0031: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), monthly (dollars); and NRCan estimated industry price deflators.
- Statistics Canada. CANSIM table 379-0031: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790031&paSer=&pattern=&stByVal=1&p1=1&p2=1&tabMode=dataTable&csid=**
- Statistics Canada. CANSIM table 379-0029: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790029&&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Statistics Canada. CANSIM table 379-0023: Gross domestic product (GDP) at basic prices in current dollars, System of National Accounts (SNA) benchmark values, by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790023&&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Statistics Canada. CANSIM table 379-0024: Gross domestic product (GDP) at basic prices in current dollars, System of National Accounts (SNA) benchmark values, special industry aggregations based on the North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790024&&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**

Notes

- CANSIM table 379-0031 replaces 379-0027 and changes from 2002 dollars to 2007 dollars.
- CANSIM tables 379-0023 and 379-0024 were terminated and replaced by CANSIM table 379-0029.

Indicator: Production

Sources

- APA – The Engineered Wood Association. Quarterly production reports.
- Food and Agriculture Organization of the United Nations, Statistics Division. **http://faostat3.fao.org/download/F/FO/E**
- Pulp and Paper Products Council.
- Statistics Canada. CANSIM table 303-0064: Lumber production, shipments and stocks, by Canada and provinces. **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3030064&paSer=&pattern=&stByVal=1&p1=1&p2=1&tabMode=dataTable&csid=**

Note

- Data used for lumber production include total softwood production for Canada.

Indicator: Exports

Source

- Statistics Canada. Merchandise trade data.

Note

- In 2014, the Harmonized System (HS) Codes used were revised slightly to ensure that they align with other federal reports. "Total all forest products" now comprises only HS Codes 44, 47 and 48. "Printing and writing paper" includes three new codes: 480210, 480220 and 480900. The changes affect less than 1% of the trading value in both cases.

How is the forest industry changing?

Notes

- Additional information about Natural Resources Canada–Canadian Forest Service's Investments in Forest Industry Transformation program can be found at:
  - Natural Resources Canada–Canadian Forest Service. Investments in Forest Industry Transformation Program. **http://www.nrcan.gc.ca/forests/federal-programs/13139**
  - Natural Resources Canada–Canadian Forest Service. Minister Rickford announces call for proposals for the next phase of investments in forest products innovation. **http://news.gc.ca/web/article-en.do?nid=863019**
  - Natural Resources Canada–Canadian Forest Service. Investments in Forest Industry Transformation–Information for applicants. **http://cfs.nrcan.gc.ca/pubwarehouse/pdfs/35625.pdf**

Indicator: Financial performance

Source

- Statistics Canada. Quarterly financial statistics for enterprises (61-008-X) (special extraction).

Indicator: Secondary manufacturing

Sources

- Industry Canada. Trade data online. **https://www.ic.gc.ca/app/scr/tdst/tdo/crtr.html?productType=NAICS&lang=eng**
- Statistics Canada. CANSIM table 301-0003: Annual survey of manufactures (ASM), principal statistics by North American Industry Classification System (NAICS), incorporated businesses with employees having sales of manufactured goods greater than or equal to $30,000. **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3010003&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid**
- Statistics Canada. CANSIM table 301-0006: Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3010006&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid**
- Statistics Canada. CANSIM table 304-0014: Manufacturers' sales, inventories, orders and inventory to sales ratios, by North American Industry Classification System (NAICS), Canada, annual (dollars x 1,000). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3040014&paSer=&pattern=&stByVal=1&p1=1&p2=50&tabMode=dataTable&csid**

Notes

- Industry Canada defines "value added" as a measure of net output – that is, of gross output less those purchased inputs that have been embodied in the value of the product.
- Statistics Canada CANSIM table 301-0003 covers value-added data for 1997–2003 for the same industry codes noted below. Because of changes in survey methods and definitions, data from CANSIM tables 301-0006 and 301-0003 are not entirely consistent.
- Statistics Canada CANSIM table 301-0006 covers value-added data for 2004 to 2012 for primary wood (NAICS 3211 and 3212), secondary wood (NAICS 3219), primary paper (NAICS 3221) and secondary paper (NAICS 3229). It does not include wood furniture and cabinetry data (NAICS 33711, 337123 and 337213).
- Domestic consumption is calculated as domestic sales minus exports plus imports.

Indicator: Forest industry carbon emissions

Sources

- Natural Resources Canada. Comprehensive energy use database. **http://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive_tables/list.cfm**
- Statistics Canada. *Report on energy supply and demand in Canada* (2012 preliminary). **http://www.statcan.gc.ca/pub/57-003-x/57-003-x2014002-eng.htm**

Note

- The methodology for estimating the amount of primary energy attributed to wood and spent pulping liquor in the pulp and paper manufacturing sub-sector has been updated, causing changes in the data series between 1995 and 2002. In addition, from 1990 to 2010, wood waste and spent pulping liquor were incorrectly included in other fuels when estimating electricity generation in the *Report on Energy Supply and Demand in Canada*. This has now been corrected for the 2011 and 2012 data points, but will not be corrected for prior years. These changes have directly affected the estimates for industrial energy use and electricity generation, and indirectly affected the emissions estimates. The time series data for 1990–2012 may therefore not be completely consistent with data for earlier years.

Statistical profiles

Forest inventory

Sources

Forest area by classification

- National Forest Inventory. Standard reports, Table 4.1, Area of forest and non-forest land by terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T4_FOR_AREA_en.html**

Forest area change

- Environment Canada. 2015. National inventory report 1990–2013: Greenhouse gas sources and sinks in Canada. **http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php**

Forest type

- National Forest Inventory. Standard reports, Table 5.1, Area of forest land by forest type, age class and terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T5_FORAGE20_AREA_en.html**

Growing stock

- National Forest Inventory. Standard reports, Table 15.1, Total tree volume on forest land by type, age class, and terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T15_FORAGE20_VOL_en.html**

Forest ownership

- National Forestry Database. Forest inventory – Background – Ownership. **http://nfdp.ccfm.org/inventory/background_e.php**

Notes

- *Forest area change* – Environment Canada's *National Inventory Report 1990–2013* uses Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Report System data and analysis.
- *Forest area by classification* – The National Forest Inventory uses the following definitions from the Food and Agriculture Organization of the United Nations (FAO):
  - *Forest land* – areas of land where tree canopies cover more than 10% of the total area and the trees, when mature, can grow to a height of more than 5 metres. Does not include land that is predominantly urban or used for agricultural purposes.
  - *Other land with tree cover* – areas of land where tree canopies cover more than 10% of the total area and the trees, when mature, can grow to a height of at least 5 metres. Includes treed areas on farms, in parks and gardens, and around buildings. Also includes tree plantations established mainly for purposes other than wood production, such as fruit orchards.
  - *Other wooded land* – areas of land where: 1) tree canopies cover 5–10% of the total area and the trees, when mature, can grow to a height above 5 metres; or 2) shrubs, bushes and trees together cover more than 10% of the area. These areas include treed wetlands (swamps) and land with slow-growing and scattered trees. They do not include land that is predominantly agricultural or urban.

Disturbance

Sources

Insects

- National Forestry Database. Forest insects – National tables, Table 4.1, Area within which moderate to severe defoliation occurs including area of beetle-killed trees by insects and province/territory, 1975–2013. **http://nfdp.ccfm.org/data/compendium/html/comp_41e.html**

Fire

- Canadian Interagency Forest Fire Centre. 2014. *Canada report 2014.* **http://www.ciffc.ca/images/stories/pdf/2014_canada_report.pdf**
- National Forestry Database. Forest fires – National tables, Table 3.1, Forest fire statistics by province/territory/agency, 1990–2013. **http://nfdp.ccfm.org/data/compendium/html/comp_31e.html**

Notes

- *Insects* – data include those areas where there is tree mortality and moderate to severe defoliation. Defoliation does not always imply mortality. For example, stands with moderate defoliation often recover and may not lose much growth. Also, defoliation is mapped on an insect species basis, and a given area may be afflicted by more than one species at a time. This may result in double or triple counting in areas affected by more than one species, exaggerating the extent of the total area defoliated.
- *Fire* – national data include all burned areas within Canada's forests. Provincial data do not include fires within national parks. In 2014, 81 fires burned 282,125 hectares in national parks across Canada.

Forest management

Sources

Harvesting

- National Forestry Database. Silviculture – National tables, Table 6.2, Area harvested by ownership, harvesting method and province/territory. **http://nfdp.ccfm.org/data/compendium/html/comp_62e.html**
- National Forestry Database. Forest products – National tables, Table 5.2, Net merchantable volume of roundwood harvested by species group, ownership and province/territory, 1990–2013. **http://nfdp.ccfm.org/data/compendium/html/comp_52e.html**

Regeneration

- National Forestry Database. Silviculture – National tables, Table 6.6, Area of direct seeding by ownership and province/territory. **http://nfdp.ccfm.org/data/compendium/html/comp_66e.html**
- National Forestry Database. Silviculture – National tables, Table 6.7, Area planted by ownership, species and province/territory. **http://nfdp.ccfm.org/data/compendium/html/comp_67e.html**

Third-party certification

- Certification Canada. Canadian statistics. **http://certificationcanada.org/en/statistics/canadian-statistics/**

Protected forest

- National Forest Inventory. Standard reports, Table 22.1, Area of forest land by IUCN category, and terrestrial ecozone in Canada. **https://nfi.nfis.org/publications/standard_reports/NFI3_T22_PSOWN_AREA_en.html**

Notes

- *Harvesting* – the national and provincial/territorial figures for harvesting volume include data for industrial roundwood, fuel wood and firewood.
- *Area planted and seeded* – the total area planted and seeded for Canada includes all federal, provincial and territorial Crown land, and private land.
- *Third-party certification* – if a forest area has been certified to more than one of the three sustainable forest management standards (Canadian Standards Association [CSA], Sustainable Forestry Initiative [SFI], and Forest Stewardship Council [FSC]), the area is counted only once. Therefore, the total certification for sustainable forest management standards may be less than the sum of the individual totals for these standards.

Greenhouse gas inventory

Source

- Environment Canada. 2015. National inventory report 1990–2013: Greenhouse gas sources and sinks in Canada. **http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php**

Notes

- Environment Canada's *National Inventory Report 1990–2013* uses Natural Resources Canada–Canadian Forest Service's National Forest Carbon Monitoring, Accounting and Report System data and analysis.
- For forest lands affected by land-use change, the deforestation and afforestation figures reflect annual rates. Figures for CO_2-equivalent (CO_2e) emissions and removals reflect the current year plus the previous 20 years. Thus, the figures for CO_2e emissions include residual emissions from areas deforested over the past 20 years, and the figures for CO_2e removals include ongoing removals by areas afforested over the past 20 years.
- Emissions and removals exactly match the most recent greenhouse gas inventory figures submitted to the United Nations Framework Convention on Climate Change. Emissions bear a positive sign. Removals bear a negative sign.

Domestic economic impact

Sources

Canadian housing starts

- Statistics Canada. CANSIM table 027-0009: Canada Mortgage and Housing Corporation, housing starts, under construction and completions, all areas. **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0270009&paSer=&pattern=&stByVal=1&p1=1&p2=1&tabMode=dataTable&csid=**

Contribution to nominal GDP

- Natural Resources Canada–Canadian Forest Service's calculations based on Statistics Canada's CANSIM table 379-0031: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS), and estimated industry price deflators.

Contribution to real GDP

- Statistics Canada. CANSIM table 379-0031: Gross domestic product (GDP) at basic prices, by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3790031&paSer=&pattern=&stByVal=1&p1=1&p2=1&tabMode=dataTable&csid=**

Revenue from goods manufactured

- Statistics Canada. CANSIM table 301-0006: Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?id=3010006&pattern=&p2=-1&stByVal=1&p1=1&tabMode=dataTable&paSer=&csid=&retrLang=eng&lang=eng**
- Statistics Canada. CANSIM table 301-0007: Logging industries, principal statistics by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3010007&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**

Notes

- *Canadian housing starts* – a rate adjustment is used for economic or business data that attempts to remove seasonal variations in the data. The time of year will affect most data. Adjusting for the seasonality in data enables more accurate month-to-month comparisons. The SAAR (seasonally adjusted at annual rate) is calculated by dividing the unadjusted annual rate for the month by its seasonality factor and creating an adjusted annual rate for the month. These adjustments are more often used when economic data are released to the public.
- *Contribution to GDP* – a measure of the economic production that takes place within the geographical boundaries of Canada. Nominal GDP is measured in current dollars and is available only for Canada. Current dollars are used to describe the value of production in any given year. Real GDP is measured in 2007 dollars and corrects for inflation, enabling accurate comparisons between years.
- *Revenue from goods manufactured* – includes revenue from the sale of goods manufactured using materials owned by the establishment, as well as from repair work, manufacturing service charges and work contracted to others.

Forest industry employment

Sources

Employment

- Statistics Canada. Labour force survey (special extraction).
- Statistics Canada. CANSIM table 281-0023: Employment (SEPH), unadjusted for seasonal variation, by type of employee for selected industries classified by the North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=2810023&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Statistics Canada. CANSIM table 383-0031: Labour statistics consistent with the System of National Accounts (SNA), by province and territory, job category and North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3830031&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Indirect employment is calculated by Natural Resources Canada using Statistics Canada's National Symmetric Input-Output Tables (15-207-XCB) and Statistics Canada's National Multipliers (15F0046XDB).

Wages and salaries

- Statistics Canada. CANSIM table 301-0006: Principal statistics for manufacturing industries, by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3010006&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Statistics Canada. CANSIM table 301-0007: Logging industries, principal statistics by North American Industry Classification System (NAICS). **http://www5.statcan.gc.ca/cansim/a26?id=3010007&pattern=&p2=-1&stByVal=1&p1=1&tabMode=dataTable&paSer=&csid=&retrLang=eng&lang=eng**

Notes

- *Employment* – includes jobs held by people employed directly in the following industries: forestry and logging; industries involved in support activities for forestry; pulp and paper product manufacturing; and wood product manufacturing. Data are sourced from Statistics Canada's Labour Force Survey (LFS) and the Survey of Employment, Payrolls and Hours (SEPH). The LFS data are used to capture the level of self-employment in the forest sector. The SEPH data are used for comparing direct employment in forestry with that in other sectors. The System of National Accounts (SNA) is used by Statistics Canada to assemble all of the relevant data on the Canadian economy into a consistent set of metrics.
- *Wages and salaries* – the earnings, in cash or in kind, of Canadian residents for work performed before deduction of income taxes and contributions to pension funds, employment insurance and other social insurance schemes.

Trade

Source

- Statistics Canada. Merchandise trade data (special extraction), monthly data.

Notes

- *Balance of trade* – the difference between the value of the goods and services that a country exports and the value of the goods and services that it imports. If a country's exports exceed its imports, it has a trade surplus. If its imports exceed exports, the country has a trade deficit.
- The value of imports (in 2014 dollars) for primary wood products for the province of Prince Edward Island (PEI) is not available and therefore is not included in the calculation of the total value of imports or the balance of trade for either PEI or Canada.

Domestic production and investment

Sources

Production

- Statistics Canada. CANSIM table 303-0064: Lumber production, shipments and stocks, by Canada and provinces. **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=3030064&paSer=&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**
- Pulp and Paper Products Council.
- APA – The Engineered Wood Association.

Capital expenditures and repair expenditures

- Statistics Canada. CANSIM table 029-0045: Capital and repair expenditures, by North American Industry Classification System (NAICS), Canada, provinces and territories. **http://www5.statcan.gc.ca/cansim/a26?lang=eng&retrLang=eng&id=0290045&&pattern=&stByVal=1&p1=1&p2=-1&tabMode=dataTable&csid=**

Notes

- *Production* – production and consumption figures for newsprint, printing and writing paper, and wood pulp are based on Pulp and Paper Products Council data. The production and consumption data of structural panels (plywood and oriented strandboard) are from APA – The Engineered Wood Association.
- *Capital expenditures* – includes the costs of procuring, constructing and installing or leasing new durable plants, machinery and equipment, whether for the replacement of or addition to existing assets. Also included are all capitalized costs, such as costs for feasibility studies and architectural, legal, installation and engineering fees; the value of capital assets put in place by firms, either by contract or with the firm's own labour force; and capitalized interest charges on loans for capital projects.
- *Repair expenditures* – includes costs to repair and maintain structures, machinery and equipment.

Domestic consumption

Source

- Consumption figures for a range of products, calculated by Natural Resources Canada.

Note

- This information is available only at the national level.

Spot the forest products – answer key

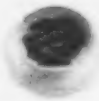
Some clothes are made of rayon, which is produced from the wood component cellulose. Rayon fabrics are soft and comfortable, and can imitate the feel and texture of silk, wool, cotton and linen.

The paper towel on the counter and the napkins on the table are obvious forest products. Tissue products, like paper towels, medical gowns and wipes are important contributors to safety in today's modern health care facilities.

In 2014, Canada produced 29 million litres of maple products, worth $310 million.

Bioplastics can be manufactured from cellulose. They can be partly or fully bio-based, biodegradable, or both. Global bioplastics production capacity is set to grow 300% by 2018 *(Source: European Bioplastics)*.

Hardwood floors are a traditional and beautiful choice for interior flooring. They are strong, durable and easy to keep clean.



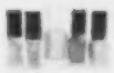
Canada is the world's largest producer of wild (low-bush) blueberries. In 2014, Canada exported $207 million of fresh and frozen blueberries.

The LCD screens of many of today's electronics contain the wood component cellulose triacetate, which is applied as a layer within screens and acts as a polarizing film.

Wooden cabinetry creates a warm and inviting interior. Each piece of wood has attractive variations in grain and colour that can be used to create a variety of styles.

Even in our electronics-dominated society, printed materials are everywhere. Because Canada's forests are sustainably managed, using this country's paper products is an environmentally responsible choice.

In addition to adding character and warmth to any room, wooden furniture is an environmentally responsible choice. Durable wooden furniture can last for generations with minimal care.



Some nail polishes contain the wood component nitrocellulose, which adds strength and has quick-drying properties. You can find nitrocellulose in many different products, including fireworks!

Packaging manufacturers are increasingly using biomaterials, and consumers are loving it! In fact, in January 2015, the world saw the first sale of a totally plant-based carton *(Source: Tetra Pak)*.

More than half of Canadians shop online at least monthly *(Source: PWC 2015)*. Forest-based packaging products play a major role in protecting their goods in transit and have a small environmental footprint.

Many pills contain microcrystalline cellulose, a substance used by the pharmaceutical industry as a cost-effective and non-toxic vehicle to deliver active ingredients to a patient's body.

Some paints contain hydroxyethyl cellulose, a thickening agent used to reduce spatter. Forest sector innovation is creating advanced chemicals that can improve the performance of paints and coatings.

Sources

http://www.pwc.com/gx/en/retail-consumer/retail-consumer-publications/global-multi-channel-consumer-survey/survey-highlights.jhtml
http://www.tetrapak.com/packages/chilled-packages/tetra-rex
http://en.european-bioplastics.org

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Reader feedback

What information or section in this year's report was most useful to you?

Which category best describes your affiliation?

- ○ Provincial/territorial government
- ○ Federal government
- ○ General public
- ○ Industry
- ○ Education
- ○ International
- ○ Other

What topics or changes would you suggest for future editions of the report?

Please provide any additional comments or suggestions you have related to this report.

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